Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184,29 (2022)	24-Jun-2022

Q(β^-)=−5398.01 *23*; S(n)=12311.01 *7*; S(p)=7296.553 *22*; Q(α)=−9668.60 *5* 2021Wa16
S(2n)=23630.3 *4*, S(2p)=20810.7 *3* (2021Wa16).
Mass measurements: 2009Kw02, 2008Re16, 2006Re19.
Other measurements:
2018De02: ^{12}C(^{19}F,X) E=127 MeV at the Pelletron Linac Facility, Mumbai. Measured high-energy γ-ray spectra of giant dipole resonance (GDR). Deduced GDR parameters.
2018Mo22,2016Mo35: ^{27}Al(α,X) E=28, 35, 42 MeV at the Variable Energy Cyclotron Centre (VECC), Kolkata. Measured high-energy γ-ray spectra of GDR. Deduced GDR parameters. Systematic study of ground parameters.
2012Zh06: ^{9}Be(^{40}Ar,X) E=57 MeV/nucleon. Measured fragment yield, momentum distributions at HIRFL facility; deduced target dependence on production cross section.
1982Ve13: ^{31}P(^{3}He,^{3}He) E=25 MeV. Measured $\sigma(\theta)$ Deduced optical model parameters, matter and charge radii.
1983Gl07: ^{31}P(n,n) E=thermal, measured phase shift, scattering length.
1968Bu10: ^{31}P(α,α') E-25 MeV. Measured σ(Eα,θ).
1972Ko36, 1962La26: measured hyperfine structure.
Theoretical calculations: 73 primary references for structure retrieved from the NSR database (www.nndc.bnl.gov/nsr/) are listed under 'document records'.
Additional information 1.

^{31}P Levels

Adopted proton pickup spectroscopic factors from 1977En02 evaluation listed below were averaged (by 1977En02) with corresponding neutron pickup spectroscopic factors for ^{31}S.

Cross Reference (XREF) Flags

A	^{31}Si β^- decay (157.24 min)	N	^{28}Si(^{19}F,^{16}O)	Others:	
B	^{31}S ε decay (2.5534 s)	O	^{29}Si(^{3}He,p)	AA	^{31}P(p,p$'$)
C	^{32}Cl εp decay (300.1 ms)	P	^{29}Si(α,d)	AB	^{31}P(p,p$'\gamma$)
D	^{12}C(^{20}Ne,pγ),^{16}O(^{16}O,pγ)	Q	^{30}Si(p,γ)	AC	^{31}P(d,d$'$)
E	^{20}Ne(^{12}C,p)	R	^{30}Si(p,p):resonances	AD	^{32}S(γ,pγ')
F	^{24}Mg(^{12}C,αpγ)	S	^{30}Si(p,α):resonances	AE	^{32}S(e,e$'$p)
G	^{24}Mg(^{16}O,2αpγ)	T	^{30}Si(d,n)	AF	^{32}S(n,d)
H	^{27}Al(α,γ):resonances	U	^{30}Si(^{3}He,d),(pol ^{3}He,d)	AG	^{32}S(d,^{3}He),(pol d,^{3}He)
I	^{27}Al(α,p):resonances	V	^{30}Si(α,t)	AH	^{32}S(^{13}C,^{14}N)
J	^{27}Al(^{6}Li,d)	W	^{30}Si(^{16}O,^{15}N)	AI	^{33}S(p,^{3}He)
K	^{28}Si(α,p),^{4}He(^{28}Si,p)	X	^{31}P(γ,γ')	AJ	^{33}S(d,α)
L	^{28}Si(α,pγ),^{4}He(^{28}Si,pγ)	Y	^{31}P(e,e$'$)	AK	^{34}S(p,α)
M	^{28}Si(^{18}O,^{15}N)	Z	^{31}P(n,n$'\gamma$)	AL	Coulomb excitation

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[b]	XREF	Comments
0.0	1/2$^+$	stable	ABCDEFGH JKLMNOPQ TUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL μ=+1.130925 *5* (2011La24,2019StZV) J$^\pi$: spin from optical spectroscopy (1933As01,1949Cr31), paramagnetic resonance (1954Fl41) and microwave spectroscopy (1949Gi28); L(pol d,^{3}He)=L(^{3}He,d)=L(d,n)=0 from 0$^+$ target. μ: from gas phase NMR with new estimate for the absolute shielding constants (2011La24). Other: +1.130903 *17* from gas phase NMR, with accurate shielding effects (2005An15),

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				+1.13160 *3* (1954Wa37,NMR), 1.133 *1* (1969Se11,paramagnetic resonance), 1.13176 *6* (1963Ba23,NMR), 1.13177 *12* (1955Fa45,NMR), 1.13159 *6* (1952Ka06,NMR), 1.13183 *8* (1951Sh33,NMR), 1.13161 *12* (1949Bi07,NMR), +1.5 *5* (1949Cr31,optical spectroscopy), 1.1321 *2* (1948Po09,NMR). See also 2019StZV compilation. RMS charge radius: $(<r^2>)^{1/2}$=3.1889 fm *19* (2013An02 evaluation). Adopted (1977En02) proton stripping spectroscopic factor=0.75 *8*. Adopted (1977En02) proton pickup spectroscopic factor=2.0 *2*.
1266.08 *8*	3/2$^+$	510 fs *24*	AB DEFGH JKLMNOPQ TUVWXYZ	g_J=−2.00165 *39* (1964Pe11), atomic beam magnetic resonance. XREF: Others: AA, AB, AC, AD, AE, AF, AG, AI, AJ, AL μ=+0.30 *8* (1982Ho06,2020StZV) B(E2)↑=0.0070 *8* Jπ: L(pol ^{3}He,d)=2 from 0$^+$ and L-1/2 transfer from analyzing power. $T_{1/2}$: weighted average of 510 fs *24* (2021To09) by DSAM in (^{20}Ne,pγ), 527 fs *33* (1979Po01), 555 fs *152* (1974Tw01), 451 fs *153* (1970Va12), 555 fs *56* (1969Cu01), 485 fs *49* (1979Fo02) by DSAM in (α,pγ), 270 fs *118* (1975De31), 534 fs *169* (p,γ), 513 fs *69* (1966Sk01), 665 fs *+347−146* (1964Bo22), 319 fs *160* (1960Bo23) by nuclear resonance fluorescence in (γ,γ′), and 520 fs *42* by DSAM in Coulomb excitation (1977Sc36). Others: 315 fs *+83−71* from adopted B(E2)↑=0.0070 *8* and adopted δ(E2/M1)(1266.1γ)=+0.26 *3*; 496 fs *+82−61* from Γ=0.00092 eV *13* in (γ,γ′). B(E2)↑: weighted average of 0.0073 *8* (1965Ko03) and 0.0069 *11* (1975Kl03) in (e,e′), 0.0097 *20* (1966Li02) in (p,p′), 0.0060 *10* (1977Sc36) in Coulomb excitation. μ: from transient fields using IMPAC method (1982Ho06). See also 2020StZV compilation. Adopted (1977En02) proton stripping spectroscopic factor=0.97 *14*. Adopted (1977En02) proton pickup spectroscopic factor=1.5 *2*.
2233.63 *8*	5/2$^+$	256 fs *17*	B DEFGH JKLMNOPQ TUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AI, AJ, AL μ=+2.8 *6* (1982Ho06,2020StZV) B(E2)↑=0.0118 *7* Jπ: L(pol ^{3}He,d)=2 from 0$^+$ and L+1/2 transfer from analyzing power. $T_{1/2}$: weighted average of 236 fs *21* (1974Tw01), 208 fs *79* (1970Va12), 263 fs *21* (1969Cu01), 252 fs *17* (1979Fo02), and 271 fs *18* (1979Po01) in (α,pγ), 236 fs *87* (1975De31) and 295 fs *76* (1968Wo01) in (p,γ), 256 fs *55* (1977Sc36) in Coulomb excitation. Other: 252 fs *17* from adopted B(E2)↑=0.0118 *7* and branching ratio of 2233.6γ; 310 fs *+35−29* from Γ=0.00147 eV *15* in (γ,γ′). μ: from IMPAC method (1982Ho06). See also 2020StZV compilation. B(E2)↑: weighted average of 0.0097 *11* (1965Ko03) and 0.0120 *5* (1975Kl03) in (e,e′), 0.0165 *40* (1966Li02) in (p,p′), 0.0149 *22* (1977Sc36) in Coulomb excitation. Adopted (1977En02) proton stripping spectroscopic factor=0.10 *2*. Adopted (1977En02) proton pickup spectroscopic factor=4.2 *4*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
3134.3 *4*	1/2$^+$	7.1 fs *4*	B JKLM OPQ TU XYZ	XREF: Others: AA, AB, AC, AD, AG, AI, AJ Additional information 2. E(level): other: 3133.7 *7* from (α,pγ). Jπ: L(^{3}He,d)=L(d,n)=L(d,^{3}He)=0 from 0$^+$. Other: (3/2$^+$) suggested from analysis of differential cross section in (p,p′) is inconsistent. $T_{1/2}$: from Γ=0.0645 eV *39* in (γ,γ'). Others: 9.7 fs *42* (1975De31), and 5.5 fs *31* (1968Wo01) from (p,γ), 6 fs *5* from (n,n′γ), all by DSAM. Adopted (1977En02) proton stripping spectroscopic factor=0.04 *2*. Adopted (1977En02) proton pickup spectroscopic factor=0.25 *4*.
3294.90 *13*	5/2$^+$#	85 fs *17*	D FGH JKLM O Q TU Z	XREF: Others: AA, AB, AD, AE, AG, AI, AJ, AK XREF: T(3280)AK(3260). Jπ: parity from L(^{3}He,d)=L(d,^{3}He)=2 from 0$^+$. $T_{1/2}$: weighted average of 54 fs *24* (1975De31) and 94 fs *26* (1968Wo01) in (p,γ), 90 fs *35* from (α,γ):resonances, 81 fs *25* from (α,pγ), 97 fs *17* from (n,n′γ), all by DSAM. Adopted (1977En02) proton stripping spectroscopic factor<0.01. Adopted (1977En02) proton pickup spectroscopic factor=1.2 *2*.
3414.58 *10*	7/2$^+$#	208 fs *56*	D FGH JKLM OPQ TU yZ	XREF: Others: AA, AB, AD, AG, AI, AJ XREF: y(3470). Jπ: 2148.4γ E2, ΔJ=2 to 3/2$^+$, 1181.0γ M1+E2 to 5/2$^+$. $T_{1/2}$: weighted average of 308 fs *125* (1975De31), 208 fs *62* (1968Wo01), and 159 fs *69* (1968En03) from (p,γ), 208 fs *56* from (α,γ):resonances, 222 fs *59* from (α,pγ), and 280 fs *150* from (n,n′γ). B(E2)↑=0.0039 *8* for 3415+3506 doublet in (e,e′).
3506.1 *6*	3/2$^+$#	8.8 fs *+16−12*	B JKLM OPQ TU XyZ	XREF: Others: AA, AD, AG, AI, AJ XREF: T(3490)y(3470). Additional information 3. E(level): other: 3505.4 *7* from (α,pγ). Jπ: from γ(γ,pol) and $\gamma\gamma(\theta)$ in (p,γ). $T_{1/2}$: from Γ=0.052 eV *8*. Others: 8.3 fs *42* (1975De31) and 9.0 fs *56* (1968Wo01) from (p,γ), 12 fs *8* from (n,n′γ), all by DSAM. Adopted (1977En02) proton stripping spectroscopic factor <0.01. Adopted (1977En02) proton pickup spectroscopic factor is small.
4191.01 *21*	5/2$^+$#	4.9 fs *21*	GH JKL OPQ TU yZ	XREF: Others: AB, AD, AE, AG, AI, AJ XREF: T(4170). Jπ: parity from 2924.7γ M1+E2 to 3/2$^+$. $T_{1/2}$: from (p,γ). Others: ≤10 fs from (α,pγ), ≤28 fs from (α,γ):resonances; 62 fs *10* from (n,n′γ) is discrepant. Adopted (1977En02) proton stripping spectroscopic factor=0.03 *2*. Adopted (1977En02) proton pickup spectroscopic factor=1.2 *2*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$ b	XREF	Comments
4260.4 *10*	3/2+#	10.4 fs *42*	B L OPQ TU yZ	XREF: Others: AD, AG, AI, AJ XREF: T(4240)y(4200). Additional information 4. E(level): other: 4261 *1* from (α,pγ). Jπ: L(^{3}He,d)=2 from 0+; 4260.1γ M1+E2 to 1/2+. Adopted (1977En02) proton stripping spectroscopic factor=0.06 *2*. $T_{1/2}$: from (p,γ).
4430.84 *11*	7/2−#	0.424 ps *31*	D FGH JKLM O Q TU W YZ	XREF: Others: AA, AB, AD, AG, AJ XREF: T(4421)Y(4560)AA(4370). Jπ: L(pol ^{3}He,d)=L(d,n)=3 from 0+ and L+1/2 transfer from analyzing power. 4451 in ^{31}S and 4431 in ^{31}P are probable mirror states (2008Pa27). $T_{1/2}$: weighted average of 0.28 ps *10* (1975De31) and 0.83 ps *41* (1968Wo01) from (p,γ), 0.413 ps *31* (2021To09), 0.50 ps *6* and 0.46 ps *10* (2008Pa27) from (^{20}Ne,pγ), and 0.41 ps *11* from (α,pγ), all by DSAM. Adopted (1977En02) proton stripping spectroscopic factor=0.45 *7*. Adopted (1977En02) proton pickup spectroscopic factor=0.08.
4592.5 *10*	3/2+#	13 fs *4*	B L O Q tU	XREF: Others: AA, AD, AG, AI, AJ XREF: t(4610)aa(4600). Additional information 5. E(level): other: 4594.2 *7* from (α,pγ). Jπ: parity from L(^{3}He,d)=2 from 0+. $T_{1/2}$: weighted average of 11.1 fs *42* (1975De31), 30 fs *15* (1968Wo01) from (p,γ), and 16 fs *10* from (α,pγ).
4633.58 *18*	7/2+	70 fs *14*	D FGH KL O Q t Z	XREF: Others: AA, AG, AI, AJ XREF: t(4610)aa(4600). Jπ: 1218.8γ M1+E2, ΔJ=0 to 7/2+. $T_{1/2}$: weighted average of 101 fs *28* (1975De31), 69 fs *27* (1968Wo01) from (p,γ), 62 fs *14* from (α,γ):resonances, 69 fs *20* from (α,pγ).
4784.7 *6*	5/2+#	6.9 fs *28*	H JKL O Q TU Y	XREF: Others: AA, AB, AD, AE, AG, AI, AJ, AK XREF: AA(4740)AK(4730). E(level): 4783.0 *6* from (α,pγ), 4783.4 *11* from (p,γ). Jπ: 4783.0γ E2, ΔJ=2 to 1/2+. $T_{1/2}$: from (p,γ). Others: ≤10 fs from (α,pγ); 62 fs *35* from (α,γ):resonances is discrepant.
5014.9 *10*	(3/2+)	40 fs *12*	L Q y	XREF: Others: AD, AG, AI, AJ Additional information 6. Jπ: 5014.5γ D(+Q) to 1/2+, 1719.8γ to 5/2+ and probable 1600.3γ to 7/2+; σ in (d,α) supports 1/2, which is not entirely ruled out. $T_{1/2}$: weighted average of 31 fs *12* (1975De31), 46 fs *14* (1968Wo01) from (p,γ), and 49 fs *16* from (α,pγ).
5015.2 *8*	3/2−	7.6 fs *51*	L O Q TU y	XREF: Others: AD, AG, AI, AJ Additional information 7. Jπ: L(pol ^{3}He,d)=L(d,n)=1 from 0+ and L+1/2 transfer from analyzing power. $T_{1/2}$: from DSAM in (p,γ). Other: ≤7 fs from (α,pγ).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
5115.2 *7*	5/2$^+$	10.4 fs *44*	L O Q TU y	XREF: Others: AG, AI, AJ Additional information 8. E(level): from (α,pγ). Other: 5116.0 *15* from (p,γ). Jπ: 1701.3γ M1+E2 to 7/2$^+$, 3849.6γ M1+E2 to 3/2$^+$. $T_{1/2}$: from DSAM in (α,pγ). Other: <42 fs from (p,γ).
5256.8 *15*	1/2$^+$	≤10 fs	L O Q TU X	XREF: Others: AD, AE, AG, AI, AJ Additional information 9. Jπ: L(d,^{3}He)=L(d,n)=L(^{3}He,d)=0 from 0$^+$. $T_{1/2}$: from (α,pγ).
5342.84 *13*	9/2$^+$	38 fs *11*	D FGH JKL O Q TU Y	XREF: Others: AA, AG, AI, AJ XREF: AA(5310). Jπ: 3110.2γ E2, ΔJ=2 to 5/2$^+$, 1928.0γ D(+Q) to 7/2$^+$. $T_{1/2}$: weighted average of 33 fs *11* from (α,pγ) and 58 fs *21* from (p,γ). Other: ≤21 fs from (α,γ):resonances.
5530.0 *15*	(5/2)$^+$	11 fs *5*	H L O Q TU Z	XREF: Others: AG, AI, AJ Additional information 10. E(level): other: 5529 *1* from (α,pγ). Jπ: 3296.0γ M1+E2 to 5/2$^+$, 2115.3γ M1+E2 to 7/2$^+$; σ in (d,α) supports 5/2; possible 5529.5γ to 1/2$^+$ also favors 5/2. Other: 7/2$^+$,(5/2$^+$) from $\gamma(\theta)$ in (α,pγ) (1974Tw01) seems inconsistent. $T_{1/2}$: from DSAM in (n,n′γ). Other: <7 ps from (p,γ); ≤10 fs from (α,pγ).
5558.9 *4*	3/2$^+$[#]	<17 fs	L O Q U X	XREF: Others: AA, AD, AG, AJ XREF: AA(5600). Jπ: parity from L(^{3}He,d)=2 from 0$^+$. σ in (d,α) also favors 3/2. Other: (7/2)$^-$ from (p,p′) for a group at 5600 is inconsistent. $T_{1/2}$: from (p,γ).
5672.4 *10*	5/2[#]	25 fs *6*	L O Q tU Y	XREF: Others: AA, AG, AI, AJ XREF: t(5660)AA(5630). Additional information 11. Jπ: also supported by σ in (d,α). $T_{1/2}$: from (p,γ).
5772.7 *10*	7/2$^+$	22 fs *9*	F H KL O Q TU	XREF: Others: AE, AG, AI, AJ Jπ: L(α,p)=4 from 0$^+$; σ in (d,α) favors J=7/2; 9/2$^+$ ruled out by 4507.0γ to 3/2$^+$ and RUL. $T_{1/2}$: from (p,γ). Other: ≤10 fs from (α,γ):resonances.
5892.1 *3*	9/2$^+$	24 fs *8*	GH L O Q TU	XREF: Others: AD, AG, AI, AJ XREF: AD(5910). Jπ: 3658.2γ E2, ΔJ=2 to 5/2$^+$, 2477.3γ M1+E2 to 7/2$^+$. But L(d,^{3}He)=2 from 0$^+$ for a group at 5892 *5* is inconsistent, which could indicate a different level. $T_{1/2}$: weighted average of 25 fs *8* (1975De31) and 55 fs *44* (1968En03) from (p,γ), 21 fs *8* from (α,pγ).
5987.9 *14*	(3/2)$^+$		L o Q u	XREF: Others: AD, AG, AJ XREF: L(?). Additional information 12. E(level): the 5988 level with de-exciting 4722γ in (α,pγ) is probably a different level. Jπ: L(^{3}He,d)=2 from 0$^+$; σ in (d,α) favors 3/2 but with inconsistent negative parity.
6046.4 *26*	7/2$^+$	22 fs *12*	L O Q TU	XREF: Others: AI, AJ XREF: ai(6080). Additional information 13.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				E(level): other: 6048 *1* from (α,pγ). Jπ: spin from pγ(θ) in (α,pγ); 3812.3γ M1+E2 to 5/2+. $T_{1/2}$: from DSAM in (α,pγ).
6078.53 *21*	9/2+	22 fs *12*	D FGH L O Q U	XREF: Others: AG, AI, AJ Jπ: 3844.6γ E2 (ΔJ=2) to 5/2+, 1444.4γ M1+E2 to 7/2+. $T_{1/2}$: from (α,pγ). Other: ≤42 fs from (α,γ):resonances.
6158	(1/2,3/2,5/2)		T	XREF: Others: AJ XREF: T(6180?). E(level): energy is adopted from (d,α) (1974Te02) since level energies in this region are in very good agreement with the Adopted values, estimated uncertainty is ≈5-10 keV (evaluators). Population of this level at 6180 *23* in ^{30}Si(d,n) is considered as uncertain by the evaluators since it is reported as a fairly strong line in 1965Cu03 but not in 1976Uz01. Jπ: from analysis of σ in (d,α).
6233.4 *15*	(7/2)+		K O Q TU	XREF: Others: AI, AJ Additional information 14. Jπ: L(α,p)=4 from 0+; probably the mirror state of 6138, (7/2+) level in ^{31}S (2012Do07).
6336.6 *15*	1/2+		O Q U	XREF: Others: AD, AE, AG, AJ Additional information 15. Jπ: L(pol ^{3}He,d)=0 from 0+.
6380.8 *20*	(3/2)+	<7 fs	O Q TU Xy	XREF: Others: AI, AJ T=3/2 Additional information 16. Jπ: L(^{3}He,d)=L(d,n)=2 from 0+; L(p,^{3}He)=0 from 3/2+; σ from (d,α) supports 3/2.
6399.0 *10*	7/2(−)#	27 fs *12*	L Q y	XREF: Others: AA, AG, AJ XREF: y(6380)AA(6360). Additional information 17. Jπ: spin from primary γ(θ) from J=7/2 resonance and 1968γ(θ) in (p,γ); σ in (d,α) also supports 7/2; 1967.7γ (M1(+E2)) to 7/2−. $T_{1/2}$: weighted average of 22 fs *12* from (α,pγ) and 49 fs *24* from (p,γ).
6453.49 *21*	11/2+	23 fs *12*	D FGH L q y	XREF: Others: AI Jπ: 3039.3γ E2 (ΔJ=2) to 7/2+, 1110.2γ M1+E2 to 9/2+. $T_{1/2}$: weighted average of 24 fs *12* (α,γ):res and 22 fs *12* (α,pγ).
6460.8 *16*	5/2+		O Q U y	XREF: Others: AG, AI, AJ Additional information 18. Jπ: L(^{3}He,d)=2 from 0+; L(^{3}He,p)=2+4 from 1/2+. But L(d,^{3}He)=0 from 0+ for a group at 6460 *5*, giving 1/2+, is inconsistent.
6497.1 *6*	3/2−		O Q TU y	XREF: Others: AG, AJ Jπ: L(^{3}He,d)=L(d,n)=1 from 0+; L(^{3}He,p)=1+3 from 1/2+.
6501.3 *3*	9/2−	38 fs *14*	D FGH L Q y	XREF: Others: AG Jπ: spin from pγ(θ) in (α,pγ); 2070.6γ M1+E2 to

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				7/2⁻. $T_{1/2}$: from DSAM in (α,pγ). Other: ≤76fs from (α,γ):resonances.
6595.5 *6*	(5/2)⁻		O Q tU y	XREF: Others: AJ Jπ: L(^{3}He,d)=3 from 0⁺; σ in (d,α) favors 5/2.
6610.4 *12*	3/2⁻		O Q tU y	XREF: Others: AG, AI, AJ Additional information 19. Jπ: L(^{3}He,d)=1 from 0⁺; 2419.3γ to 5/2⁺ disfavors 1/2⁻; σ in (d,α) also supports 3/2.
6668	(11/2⁻)		y	XREF: Others: AA, AI, AJ XREF: AA(6690)AI(6690). E(level): from (d,α). Jπ: suggested in (p,p′) based on theoretical predictions.
6796.0 *3*	9/2⁻	139 fs *41*	FGH L U	Jπ: 2364.8γ M1+E2, ΔJ=1 to 7/2⁻; 5/2⁻ ruled out by a strong 1063.4γ from J=11/2 level. $T_{1/2}$: from (α,pγ). Other: 152 fs *62* from (α,γ):resonances.
6823.91 *18*	11/2⁻	62 fs *26*	D FG L o Q u	XREF: u(6826.5). Jπ: 2393.8γ E2, ΔJ=2 to 7/2⁻, 1480.8γ E1 to 9/2⁺; L(^{3}He,d)=5. $T_{1/2}$: from DSAM in (α,pγ).
6828 *3*	(7/2⁻,9/2⁺)	83 fs *35*	H o	XREF: Others: AG Additional information 20. E(level),$T_{1/2}$: from (α,γ):resonances. Jπ: γ rays to 5/2⁺, 7/2⁻, 7/2⁺; 5375γ from 11/2⁻.
6841.9 *15*	(5/2)⁻		o Q U	XREF: Others: AG, AJ XREF: U(6844.0). Additional information 21. Jπ: L(^{3}He,d)=3 from 0⁺; σ in (d,α) favors 5/2.
6909.6 *16*	(3/2)⁻		O Q TU X	XREF: Others: AD, AG, AJ XREF: U(6911.3). Additional information 22. Jπ: L(^{3}He,d)=L(d,n)=1 from 0⁺; σ in (d,α) favors 3/2.
6931.4 *20*	5/2⁺	<28 fs	H KL O Q U	XREF: Others: AG, AJ XREF: U(6933.2). Additional information 23. Jπ: spin from pγ(θ) in (α,pγ); 4697.2γ M1+E2 to 5/2⁺. $T_{1/2}$: from (α,pγ) and (p,γ).
7068.5 *9*	5/2⁻,7/2⁻		tU	XREF: Others: AA, AG, AI, AJ XREF: aa(7030). E(level): from (^{3}He,d). Jπ: L(^{3}He,d)=3 from 0⁺.
7074 *6*	(1/2,3/2)⁺		O t	XREF: Others: AA, AG, AI, AJ XREF: aa(7030). E(level): from (^{3}He,p). Jπ: L(^{3}He,p)=0(+1) from 1/2⁺. L=1 component may belong to 7068 and/or 7079.9 levels.
7079.9 *19*	(3/2)⁻		L Q tU	XREF: Others: AA, AG, AI, AJ XREF: U(7082.4)aa(7130). Additional information 24. Jπ: 2648.6γ to 7/2⁻; primary 2320.7γ from 1/2⁺ proton resonance; L(^{3}He,d)=1 from 0⁺.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
7084.0 *17*	(3/2$^+$,5/2$^+$)		Q t	XREF: Others: AA, AG, AI, AJ XREF: aa(7130). Additional information 25. Jπ: 3669.1γ to 7/2$^+$, possible 3939.4γ to 1/2$^+$.
7117.7 *10*	9/2$^+$	≤17 fs	H L Q y	XREF: Others: AA, AI XREF: y(7140)aa(7130)ai(7140). Additional information 26. E(level): from (α,γ):resonances. Other: 7117.9 *27* from (p,γ). Jπ: spin from pγ(θ) in (α,pγ); 3703γ M1+E2 to 7/2$^+$. $T_{1/2}$: from (α,pγ). Other: ≤69 fs from (α,γ):resonances.
7141.1 *18*	1/2$^+$		O Q TU XY	XREF: Others: AA, AI, AJ XREF: aa(7130). Additional information 27. Jπ: L(^{3}He,d)=L(d,n)=0 from 0$^+$.
7159.7 *16*	3/2$^+$,5/2$^+$		U	XREF: Others: AA, AG XREF: aa(7130). E(level): from (^{3}He,d). Other: 7158 *5* from (d,^{3}He). Jπ: L(d,^{3}He)=2 from 0$^+$. L(^{3}He,d)=(1,3) from poor fits is inconsistent.
7214.3 *20*	1/2$^-$,3/2$^-$		K O Q TU X	XREF: Others: AD, AG, AJ, AK XREF: AK(7240). Additional information 28. Jπ: L(d,^{3}He)=L(d,n)=1 from 0$^+$.
7313.7 *16*	(1/2,3/2)$^+$		O Q X	XREF: Others: AG, AJ Additional information 29. Jπ: L(^{3}He,p)=0 from 1/2$^+$.
7316.1 *9*	5/2$^-$,7/2$^-$		U	XREF: Others: AG E(level): from (^{3}He,d). Jπ: L(^{3}He,d)=3 from 0$^+$.
7347.1 *12*	(3/2)$^-$		O U	XREF: Others: AG, AI, AJ XREF: AJ(7356). E(level): from (^{3}He,d). Others: 7349 *6* from (^{3}He,p), 7344 *5* from (d,^{3}He). Jπ: L(^{3}He,p)=1+3 from 1/2$^+$ target; L(^{3}He,d)=1 or 2 from 0$^+$.
7442.1 *3*	11/2$^+$	12 fs *10*	D FGH L	Jπ: 4027.5γ E2, ΔJ=2 to 7/2$^+$; 988.1γ ΔJ=0 to 11/2$^+$. $T_{1/2}$: from DSAM in (α,γ):resonances using 4027.5γ. Other: ≤10 fs from (α,pγ).
7445.7 *29*	(3/2$^+$,5/2,7/2$^-$)		U	Jπ: L(^{3}He,d)=(2,3) from 0$^+$.
7466 *2*	(7/2)$^-$	≤21 fs	H L O TU	XREF: Others: AI, AJ Additional information 30. E(level): from (α,pγ). Other: 7470.4 *22* from (^{3}He,d). Jπ: L(^{3}He,p)=3(+5) from 1/2$^+$; L(^{3}He,d)=(3) from 0$^+$; γ rays to 9/2$^-$, 7/2$^-$ and 7/2$^+$. $T_{1/2}$: from (α,γ):resonances.
7572				XREF: Others: AI, AJ XREF: AI(7600).
7687.2? *20*			Q U	XREF: Q(?).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				Additional information 31. E(level): could be the same level as 7690.9 in (^{3}He,d).
7690.9 *10*	5/2$^-$,7/2$^-$		U	Jπ: L(^{3}He,d)=3 from 0$^+$.
7717.2 *3*	(5/2)$^-$		O Q TU	XREF: U(7719.4). Jπ: L(^{3}He,d)=3 from 0$^+$; 2702.3γ to (3/2$^+$).
7737.3 *8*	5/2$^-$,7/2$^-$		U	Jπ: L(^{3}He,d)=3 from 0$^+$.
7781.17 *24*	3/2$^-$#		O Q TU	Jπ: from γγ(θ) and γ(lin pol) in (p,γ); also supported by L(^{3}He,d)=1 from 0$^+$.
7825 *12*			O	XREF: Others: AA
7851.2 *8*	(1/2$^-$,3/2)		O U X	XREF: Others: AA, AG E(level): from (^{3}He,d). Jπ: L(^{3}He,p)=(0+2) or (1) from 1/2$^+$; L=1,2 from 0$^+$.
7859.6 *3*	11/2$^{(-)}$		FG U	XREF: U(7863.8). Jπ: 3428.6γ, ΔJ=2 to 7/2$^-$; 2516.8γ ΔJ=1 to 9/2$^+$. L(^{3}He,d)=(3) is inconsistent if the same levels are being populated.
7897.9 *3*	1/2$^-$#	64 eV *9*	O Q TU X	XREF: Others: AA, AG Jπ: L(^{3}He,d)=L(d,n)=1 from 0$^+$; spin=1/2 from isotropic γ(θ) in (p,γ). $T_{1/2}$: weighted average of 54 eV *14* from (p,γ) and 68 eV *9* from (γ,γ′).
7911.5 *8*	5/2$^-$,7/2$^-$		U	Jπ: L(^{3}He,d)=3 from 0$^+$.
7944.6 *10*	3/2$^+$,5/2$^+$		Q U	XREF: Others: AG XREF: U(7946.2). Additional information 32. Jπ: L(^{3}He,d)=2 from 0$^+$.
7976.4 *8*	3/2$^+$,5/2$^+$		U	XREF: Others: AD, AK XREF: ak(7970). E(level): from (^{3}He,d). Jπ: L(^{3}He,d)=2 from 0$^+$. L(p,α)=1 from 0$^+$ for a level at 7979 *30* suggests (1/2,3/2)$^-$.
7994 *6*	(5/2)$^-$		O	XREF: Others: AK XREF: ak(7970). Jπ: L(^{3}He,p)=1 from 1/2$^+$; L(^{3}He,d)=(2,3) from 0$^+$. L(p,α)=1 from 0$^+$ for a level at 7979 *30* suggests (1/2,3/2)$^-$.
8031.2 *9*	5/2$^+$#		K Q	XREF: Others: AG Additional information 33. Jπ: parity from L(α,p)=2 from 0$^+$. But L(d,^{3}He)=(1) for a group at 8033 *5* is inconsistent.
8047.7 *10*	3/2$^-$#		O Q TU	Additional information 34. Jπ: parity from L(^{3}He,d)=L(d,n)=1 from 0$^+$.
8076.91 *22*	11/2$^{(-)}$		G O U	XREF: U(8078.0). Jπ: 3645.6γ ΔJ=2 to 7/2$^-$; 1253.4γ ΔJ=0 to 11/2$^-$. L(^{3}He,d)=(1) is inconsistent, but L=(1) is from a poor fit.
8103.6 *13*	5/2$^+$#		Q U	Additional information 35. Jπ: parity from L(^{3}He,d)=2 from 0$^+$.
8207.9 *10*	3/2$^+$#	2.6 eV *2*	o Q U X	Additional information 36. Jπ: parity from L(^{3}He,p)=0 from 1/2$^+$.
8224.4 *10*	7/2$^{(-)}$#		Q u	Additional information 37. Jπ: parity from 1400.2γ to 11/2$^-$.
8242.7 *10*	5/2$^-$#		o Q u	Additional information 38.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				Jπ: most likely the L=3 component in L(^{3}He,d)=1+3 for a level at 8242 *6* considering L(d,n)=1 for a level at 8251 *4*. L(^{3}He,p)=1+3 probably also corresponds to the 8243+8248 doublet.
8247.6 *10*	(3/2)$^-$		o Q Tu	Additional information 39. Jπ: L(d,n)=1 from 0$^+$ gives 1/2$^-$,3/2$^-$; γ rays to 5/2$^+$ favor 3/2$^-$. See also comments for 8242.7 level.
8264?	3/2		Q	Additional information 40. E(level): reported only by 1958Br98 in (p,γ); not seen in other studies. Jπ: from γ(θ) in (p,γ).
8343.5 *4*	(11/2$^+$)	27 fs *7*	G	E(level): the evaluators consider the level at E=8345.5 *15* from (α,γ):resonances is the same level here seen in (^{16}O,2α,pγ), considering the most intense γ is near 4930 from each level. Jπ: 4928.5γ ΔJ=2 to 7/2$^+$ is likely E2. $T_{1/2}$: from DSAM in (α,γ):resonances.
8345.5 *15*	(7/2$^-$,9/2$^+$)	27 fs *7*	H t	XREF: t(8350). Additional information 41. E(level): from (α,γ):resonances. This level may possibly be the same as 8343.5, (11/2$^+$) since the most intense γ is near 4930 from each level, but the transitions to 5/2$^+$ are inconsistent with J^π=(11/2$^+$) based on RUL. Jπ: γ rays to 5/2$^+$ and 7/2$^+$; 3858γ from 11/2$^-$.
8355.6 *6*	5/2$^-$#		O Q tU	XREF: t(8350). Additional information 42. Jπ: parity from L(^{3}He,d)=3 from 0$^+$.
8414.2 *3*	11/2$^{(-)}$		G	Jπ: 3983.3γ ΔJ=2 to 7/2$^-$; 1590.1γ ΔJ=0 to 11/2$^-$.
8433.9 *7*	7/2$^-$#		Q U	Additional information 43. Jπ: parity from L(^{3}He,d)=3 from 0$^+$.
8461.0 *7*	5/2$^+$#	2 eV *1*	O QR tU	Additional information 44. Jπ: from γ(θ), γγ(θ) and γ(lin pol) in (p,γ); L(^{3}He,d)=2 from 0$^+$.
8470.4 *7*	5/2#		Q t	Additional information 45.
8543.6 *8*	1/2$^-$#@	54 eV *10*	o QR	XREF: o(8549). Additional information 46.
8552.2 *8*	1/2$^+$#@	0.31 keV *4*	QR u	Additional information 47. $T_{1/2}$: from (p,p):resonances. Other: 0.7 keV *4* from (p,γ).
8555.4 *8*	3/2$^-$#@	210 eV *25*	o QR Tu	XREF: o(8549)T(8564). Additional information 48. Jπ: also supported by L(d,n)=1 from 0$^+$.
8575.6 *8*	5/2$^+$#	7 eV *5*	o QR u	Additional information 49. Jπ: from γ(θ), γγ(θ) and γ(lin pol) in (p,γ).
8584.2 *8*	5/2$^{(+)}$#	50 eV *10*	o QR u	Additional information 50. Jπ: 2509.9γ to 9/2$^+$ favors positive parity. Other: 1/2$^-$ from R-Matrix analysis in (p,p):resonances is inconsistent.
8601.0 *8*	(5/2$^+$)		Q U	Additional information 51.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				Jπ: strong 2709.6γ to 9/2+; 8599.7γ to 1/2+. But 7/2− may not be completely ruled out.
8641.2 *8*	5/2+#	5 eV *3*	o QR u	XREF: Others: AA XREF: aa(8700). Additional information 52. Jπ: parity from R-Matrix analysis in (p,p):resonances and L(^{3}He,d)=2 for a level at 8646.
8649.5 *8*	3/2+#		o Q u	XREF: Others: AA XREF: aa(8700). Additional information 53. Jπ: parity from R-Matrix analysis in (p,p):resonances and L(^{3}He,d)=2 for a level at 8646.
8705.23 *23*	(13/2−)	159 fs *28*	D FG	Jπ: 1881.9γ M1+E2, ΔJ=1 to 11/2(−). $T_{1/2}$: from DSAM in (^{16}O,2αpγ).
8729.1 *9*	3/2+#		o Q u x	XREF: Others: AA XREF: aa(8700). Additional information 54. Jπ: parity from L(^{3}He,d)=2 from 0+ and L(^{3}He,p)=0+2 from 1/2+ for a group at E=8731 *6*.
8730.5 *9*	3/2+#		o Q u x	XREF: Others: AA XREF: aa(8700). Additional information 55. Jπ: parity from L(^{3}He,d)=2 from 0+ and L(^{3}He,p)=0+2 from 1/2+ for a group at E=8731 *6*.
8738.0 *9*	3/2+#@	20 eV *5*	QR u	XREF: Others: AA XREF: aa(8700). Additional information 56.
8754.5 *10*			o Q u	
8757.3 *9*	5/2+#	3 eV *2*	o QR u	Additional information 57. Jπ: from γ(θ), γγ(θ) and γ(lin pol) in (p,γ).
8763.3 *9*	1/2+@	1.45 keV *15*	QR	XREF: Others: AA XREF: aa(8700). Additional information 58. $T_{1/2}$: from (p,p):resonances. Other: 1.5 keV *4* from (p,γ).
8840.0 *10*	7/2−#	1 eV *1*	K QR U	Additional information 59. E(level),Jπ: spin=7/2 from γ(θ) in (p,γ), (5/2,7/2)− from R-Matrix analysis in (p,p):resonances, and L(α,p)=3 from 0+ for a level at 8840 would give a firm 7/2−, while L(^{3}He,d)=2 for a level at 8840 *4* gives 3/2+,5/2+, which would imply a separate level with close energy.
8902.9 *10*	1/2+#@	92 eV *15*	o QR	Additional information 60. $T_{1/2}$: weighted average of 110 eV *50* from (p,γ) and 90 eV *15* from (p,p):resonances.
8909.7 *10*	5/2+#	1 eV *1*	o QR	Additional information 61. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
8935.8 *10*	3/2+#	3 eV *2*	O QR	XREF: Others: AG Additional information 62. Jπ: parity from L(^{3}He,p)=0 from 1/2+; (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$b	XREF	Comments
8985.9 *10*	3/2#		Q	XREF: Others: AG Additional information 63.
9009 *1*	5/2+#@	70 eV *20*	O QR U	XREF: Others: AG Additional information 64. Jπ: also supported by L(^{3}He,d)=2 from 0+. $T_{1/2}$: weighted average of 100 eV *5* from (p,γ) and 65 eV *20* from (p,p):resonances.
9046.1 *11*	3/2−#@	9.2 keV *9*	QR U	XREF: Others: AG Additional information 65. Jπ: also supported by L(^{3}He,d)=1 from 0+. $T_{1/2}$: weighted average of 9.0 keV *10* from (p,γ) and 9.3 keV *9* from (p,p):resonances.
9052.7 *11*	(5/2)+		O Q	XREF: Others: AG XREF: O(9044). Additional information 66. Jπ: L(^{3}He,p)=2(+4) from 1/2+; 2671.8γ to 3/2+, 2143.0γ to (3/2)−, 2653.6γ to 7/2(−).
9067.1 *11*	5/2+#	16 eV *5*	QR	XREF: Others: AG Additional information 67. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances. $T_{1/2}$: halflife<26 fs from DSAM in (p,γ).
9113.4 *6*	7/2−#	1 eV *1*	QR	XREF: Others: AG Additional information 68. Jπ: (5/2,7/2)− from R-Matrix analysis in (p,p):resonances.
9115.5 *6*	5/2+#	22 eV *7*	o QR	XREF: Others: AG XREF: o(9121). Additional information 69. Jπ: (5/2)+ from R-Matrix analysis in (p,p):resonances.
9128.5 *6*	5/2+#	3 eV *2*	o QR u	XREF: Others: AG XREF: o(9121)u(9130). Additional information 70. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
9130.9 *6*	5/2+#	4 eV *2*	QR u	XREF: Others: AG XREF: u(9130). Additional information 71. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
9154.2 *6*	7/2(−)#		o Q	Additional information 72. Jπ: L(^{3}He,p)=0+3 from 1/2+ for a group at 9155 *6* gives 1/2+,3/2+ for one component and 3/2 to 9/2 with negative parity for the other. This level could be the negative-parity component in (^{3}He,p).
9156.2 *6*	3/2(+)#		o Q	Additional information 73. Jπ: L(^{3}He,p)=0+3 from 1/2+ for a group at 9155 *6* gives 1/2+,3/2+ for one component and 3/2 to 9/2 with negative parity for the other. This level could be the positive-parity component in (^{3}He,p).
9175.9 *3*	(13/2)−	83 fs *28*	D G	Jπ: 2722.3γ ΔJ=1 to 11/2+; 1041.7γ M1+E2 from π=−. 13/2− proposed in (^{16}O,2αpγ) but 13/2+ in

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				(^{20}Ne,pγ). $T_{1/2}$: from DSAM in (^{16}O,2αpγ).
9176.2 *6*	3/2^{-}#@	83 eV *15*	QR	Additional information 74. $T_{1/2}$: weighted average of 120 eV *50* from (p,γ) and 80 eV *15* from (p,p):resonances.
9206.1 *6*	7/2^{+}#		O Q	Additional information 75. Jπ: parity from L(^{3}He,p)=2 from 0^{+}.
9226.3 *6*	1/2^{-}#@	3.6 keV *5*	QR	Additional information 76. $T_{1/2}$: weighted average of 3.1 keV *4* from (p,γ) and 4.0 keV *4* from (p,p):resonances.
9240.7 *7*	3/2^{+}#	150 eV *15*	O QR U	Additional information 77. Jπ: (5/2)$^{+}$ from R-Matrix analysis in (p,p):resonances.
9252.9 *7*	(7/2)$^{-}$	3 eV *1*	QR	Additional information 78. Jπ: (5/2,7/2)$^{-}$ from R-Matrix analysis in (p,p):resonances; 5/2^{-} disfavored by 3361.7γ to 9/2^{+}.
9255.9 *7*	(5/2^{+},7/2^{-})		Q	Additional information 79. Jπ: 3364.7γ to 9/2^{+}, 2760.5γ to 3/2^{-}. Weak 9254.4γ E3 to 1/2^{+} is allowed by RUL and measured resonance strength.
9290.8 *8*	3/2^{-}#	10.0 keV *8*	QR U	Additional information 80. parity from L(^{3}He,d)=1 from 0^{+}. $T_{1/2}$: weighted average of 10.1 keV *8* from (p,γ) and 9.8 keV *10* from (p,p):resonances.
9312.9 *3*	(13/2^{+})	FG		Jπ: 2859.4γ ΔJ=1 to 11/2^{+}; 13/2^{+} proposed in (^{12}C,αpγ) and (^{16}O,2αpγ).
9319.5 *8*	3/2$^{(+)}$#		O Q	Additional information 81. Jπ: parity from L(^{3}He,p)=(0+2) from 1/2^{+}.
9358.1 *8*			o Q	Additional information 82. E(level),Jπ: 2241.1γ to 9/2^{+} and 2857.1γ to 9/2^{-} gives (7/2,9/2,11/2), which is however excluded by strong 6223.1γ to 1/2^{+} based on measured proton resonance strength and RUL. These conflicting results are presumably due to a possible broad resonance coinciding with this resonance, as claimed by 1975De31 in (p,γ). This conclusion also applies to the proton resonance at the 9360.8 level.
9360.8 *8*			Q	Additional information 83. E(level),Jπ: 2429.3γ to 5/2^{+}, 2766.5γ to 5/2^{-}, 2858.9γ to 9/2^{-} and 3281.8γ to /2^{+} give J=7/2, which is however excluded by 9359.3γ and 6225.8γ to 1/2^{+} based on measured proton resonance strength and RUL. These conflicting results are presumably due to a possible broad resonance coinciding with this resonance, as claimed by 1975De31 in (p,γ).
9362 *3*	3/2^{-}@	10.0 keV *10*	R U	XREF: U(9353). E(level): 9362 in ^{30}Si(p,p) could be the same as 9360.8 from ^{30}Si(p,γ), but 3/2^{-} from (p,p) is not in agreement with γ decays of 9360.8 level. Jπ: also supported by L(^{3}He,d)=1 from 0^{+} for a

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				level at E=9353 *6*.
9399.7 *8*	$1/2^+$ [@]	0.50 keV *8*	o QR	XREF: o(9406). Additional information 84.
9412.4 *8*	$7/2^-$ [#@]	0.50 keV *8*	o QR U	XREF: o(9406)U(9406). Additional information 85. Jπ: from γ(lin pol) in (p,γ).
9440.8 *9*	$3/2^{(+)}$ [#]	180 eV *20*	QR	Additional information 86. Jπ: parity from R-Matrix analysis in (p,p):resonances, but with inconsistent J=(5/2).
9448.9 *9*	$5/2^+$ [#]	0.45 keV *5*	QR U	Additional information 87. Jπ: parity from L(^{3}He,d)=2 from 0^+; $(5/2)^+$ from R-Matrix analysis in (p,p):resonances.
9449.86 *24*	$(13/2)^-$	35 fs *14*	D G	Jπ: 2627.3γ M1+E2, ΔJ=1 to $11/2^-$; 745.3γ ΔJ=0 to $(13/2^-)$. $T_{1/2}$: from DSAM in (^{16}O,2αpγ).
9476.9 *9*	$(7/2^-)$		Q	Additional information 88. Jπ: 2545.4γ to $5/2^+$, 2974.9γ to $9/2^-$, 3584.8γ to $9/2^+$ gives $(7/2,9/2^+)$; strong 9475.3γ to $1/2^+$ and proton resonance disfavors $9/2^+$ and $7/2^+$.
9515 *6*	$1/2^-,3/2^-$		O U	Jπ: L(^{3}He,d)=1 from 0^+.
9524.6 *9*	$3/2^+$	22.0 keV *22*	QR	XREF: R(9522.2). Additional information 89. E(level),Jπ: spin=3/2 from γ(θ) and γγ(θ) of 5333.2γ and 9523.0γ in (p,γ) and parity from 5333.2γ M1+E2 to $5/2^+$, however, 5092.9γ to $7/2^-$ and 6109.4γ to $7/2^+$ excludes J=3/2 based on measured proton resonance strength and RUL. $3/2^-$ from R-Matrix analysis in (p,p):resonances is also inconsistent. 1975De31 in (p,γ) state that this ambiguity presumably arises because this resonance coincides with a broad resonance.
9536.4 *10*	$5/2^+$ [#]	15 eV *10*	QR	Additional information 90. E(level): unresolved doublet in (p,γ). Jπ: spin=5/2 from 7301.7γ(θ) in (p,γ); parity from R-Matrix analysis in (p,p):resonances. However, 2721.1γ to $11/2^-$ and 3081.5γ to $11/2^+$ disfavors J≤7/2. It is likely that those two transitions belong to a different level with the similar energy. 1975De31 in (p,γ) claim that this level is an unresolved doublet.
9570.5 *10*	$3/2$ [#]		K Q X	Additional information 91. Jπ: $(5/2^-,7/2^+)$ from DWBA analysis in (α,p) for a group at 9570 is inconsistent, which could indicate a different level with similar energy.
9577.8 *10*	$7/2^{(-)}$	22 eV *10*	o QR	Additional information 92. Jπ: spin=7/2 from γ(θ) and γγ(θ) in (p,γ); 2967.2γ to $3/2^-$. But $(3/2,5/2)^+$ from R-Matrix analysis is inconsistent.
9579 *3*	$3/2^-$ [@]	20.0 keV *20*	o R u	XREF: o(9583)u(9577). Jπ: also supported by L(^{3}He,d)=1 from 0^+ for a level at E=9577 *4*.
9585.0 *10*	$(1/2^+,3/2^-)$	3.7 keV *4*	o QR u	XREF: o(9583)u(9577).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$b	XREF	Comments
				Additional information 93. Jπ: 1/2+ from R-Matrix analysis in (p,p):resonances, while J=3/2 from γ(θ) and γγ(θ) in (p,γ). L(^{3}He,d)=1 from 0+ for a level at E=9577 *4*. The evaluators consider either 1/2+ or 3/2− could be possible and it is likely there is a doublet around this energy. $T_{1/2}$: weighted average of 3.1 keV *9* from (p,γ) and 3.8 keV *4* from (p,p):resonances.
9593.8 *10*	3/2#		Q	Additional information 94. Jπ: from γ(θ) and γγ(θ) in (p,γ).
9598.5 *10*	3/2(−)#		Q	Additional information 95. Jπ: parity from 3199.3γ to 7/2(−).
9599.8 *3*	(13/2+)		G	Jπ: γ rays to 9/2+ and 11/2+; 13/2+ proposed in (^{16}O,2αpγ).
9611.9 *10*			Q	Additional information 96. E(level),Jπ: 1975De31 in (p,γ) claim this resonance must be a doublet due to γ(θ) data of 9610.3γ and 8344.6γ (excluding J≤5/2) inconsistent with 3230.9γ to 3/2+ (excluding J≥7/2).
9659 *6*	(3/2,5/2)+		O	XREF: Others: AD, AG XREF: AD(9680)AG(9680). Jπ: L(^{3}He,p)=2 from 1/2+; L(^{3}He,d)=(2) from 0+.
9718.2 *3*	(5/2,7/2)−	30 eV *10*	R u	Jπ: from R-Matrix analysis in (p,p):resonances. other: L(^{3}He,d)=1+3 from 0+ for a group at 9720 *4*.
9720.5 *10*		24.0 keV *24*	QR u	Additional information 97. E(level),Jπ: spin=1/2 from γ(θ) in (p,γ), which is however inconsistent with 2602.5γ to 9/2+, 3218.5γ go 9/2−, 3265.6γ to 11/2+; Jπ=3/2− from R-Matrix analysis in (p,p):resonances. The contradicting results imply that there could be a multiple around this energy. 1975De31 in (p,γ) claim this proton resonance level is an unresolved doublet.
9756.5 *20*	5/2+#	3 eV *2*	QR	Additional information 98. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
9760.4 *20*	5/2+#	20 eV *7*	QR	Additional information 99. Jπ: (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
9765 *3*	(3/2)+@	0.20 keV *5*	R	
9765.2 *20*	3/2−#@	0.30 keV *7*	QR	Additional information 100.
9786 *3*	3/2−@	50 keV *5*	R	
9800 *4*	1/2−,3/2−		U	Jπ: L(^{3}He,d)=1 from 0+.
9814 *3*	(5/2,7/2)−@	12 eV *5*	R	
9816.5 *20*	3/2−@	150 eV *20*	QR	
9819.4 *20*	3/2−@	4.5 keV *5*	QR	
9830 *4*	−		U	Jπ: L(^{3}He,d)=1+3 from 0+.
9840.7 *20*	(7/2)−@	66 eV *15*	QR	
9843.6 *20*		50 eV *10*	QR	Additional information 101.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				Jπ: spin=3/2 from γγ(θ) of 8576.2γ and 9841.9γ in (p,γ), while 3951.4γ to 9/2+ excludes 1/2 to 5/2− based on measured proton resonance strength and RUL. The contradicting results could indicate a doublet, also considering (3/2,5/2)+ from R-Matrix analysis in (p,p):resonances.
9852.3 *20*	(7/2)[#]		Q	Additional information 102.
9865.8 *20*	7/2[#]		Q	Additional information 103.
9867.8 *20*	3/2−[#@]	0.35 keV *4*	QR	Additional information 104.
9907.5 *21*		0.35 keV *4*	QR	Additional information 105. E(level): Doublet with E=9908.5 resolved by a difference of 0.3 *1* in energy from (p,γ), however the intensity of γ-rays from the levels was not separated. Jπ: 9/2 for E=9907.5 from 6492γ-2148γ(θ) and 3/2 for 9908.5 from 9905.8γ(θ) in (p,γ) imply this resonance is a doublet (1968Bo13). 3/2− from R-Matrix analysis in (p,p):resonances for E=9907 *3*.
9925.8 *21*	3/2[#]		Q	Additional information 106.
9928 *3*	5/2+[@]	170 eV *20*	R	
9941.3 *21*	(3/2−,5/2+)		Q	Additional information 107. Jπ: 5509.6γ to 7/2−, 4684.1γ to 1/2+.
9946.2 *21*	(5/2)−[@]	125 eV *15*	QR U	XREF: U(9950). Jπ: also L(^{3}He,d)=3 from 0+.
9963.6 *21*	1/2+[@]	5.0 keV *5*	QR	XREF: Others: AD XREF: ad(9970). $T_{1/2}$: from (p,p):resonances. Other: 5.1 keV *15* from (p,γ).
9976.2 *21*		4.2 keV *13*	Q	XREF: Others: AD, AG XREF: ad(9970)ag(9970). Jπ: (3/2+,5/2+) from L(d,^{3}He)=(2) from 0+ for a group at E=9970.
9988.7 *21*			Q	XREF: Others: AD, AG XREF: ad(9970)ag(9970).
9999.4 *21*	1/2+[@]	7.5 keV *11*	QR	XREF: Others: AD XREF: ad(9970). E(level): from (p,p):resonances. Other: 9999.4 *21* from (p,γ). $T_{1/2}$: weighted average of 5.3 keV *16* from (p,γ) and 8.0 keV *8* from (p,p):resonances.
10017.8 *21*			Q	
10019.7 *22*	5/2−[#]	1 eV *1*	QR	Additional information 108. Jπ: (5/2,7/2)− from R-Matrix analysis in (p,p):resonances.
10037.0 *3*	(13/2+)		G	Jπ: 4693.6γ ΔJ=2 to 9/2+; 2594.7γ to 11/2+.
10046 *1*	5/2−[#@]	0.22 keV *3*	QR	Additional information 109.
10075.8 *22*			k Q	XREF: k(10080). Additional information 110. Jπ: γ rays to (5/2)+ and 3/2+; (1/2,3/2+) from DWBA analysis of σ in (α,p) for a group at E=10080.
10089.4 *22*		90 eV *15*	k QR	XREF: k(10080).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$b	XREF	Comments
				Additional information 111. E(level),Jπ: (3/2)+ from (p,p):resonances, which however is excluded by 4197.2γ to 9/2+ based on measured proton resonance strength and RUL. This could imply a doublet.
10092 *3*	1/2+@	180 eV *20*	qR	
10093 *3*	3/2−@	270 eV *30*	qR	E(level): from (p,p):resonances. Other: 10092.3 *22* from (p,γ).
10099.1 *22*		1.00 keV *10*	QR	Additional information 112. E(level),Jπ: 3/2− from (p,p):resonances, which however is excluded by 4206.9γ to 9/2+ based on measured proton resonance strength and RUL. This could imply a doublet.
10116.5 *22*	1/2−@	3.4 keV *3*	QR	$T_{1/2}$: from (p,p):resonances. Other: 2.9 keV *9* from (p,γ).
10144.5 *23*	(3/2+,5/2)		Q	Additional information 113. Jπ: 6729.1γ to 7/2+, 10142.7γ to 1/2+. Jπ: 10142.7γ to 1/2+ excludes J=7/2 (M3 or E3) based on measured proton resonance strength and RUL.
10153.3 *23*	1/2+@	3.9 keV *4*	QR	$T_{1/2}$: weighted average of 4.0 keV *4* from (p,p):resonances and 3.2 keV *10* from (p,γ).
10193.0 *23*	3/2(+)#		Q	Additional information 114. Jπ: parity from 6777.6γ to 7/2+, however, J=3/2 is excluded by 4300.8γ to 9/2+ based on measured proton resonance strength and RUL. This contradicting results could indicate this level is a doublet.
10207.5 *23*			Q	
10210.4 *23*	3/2#		Q	Additional information 115.
10212 *3*			Q	Additional information 116. Jπ: 7/2 from 7977γ(θ) in (p,γ), which is however disfavored by the strong 10210γ to 1/2+.
10216.95 *22*	(15/2)−	76 fs *21*	D FG	Jπ: 3392.8γ E2, ΔJ=2 to 11/2−, 1041.7γ M1+E2 to J=(13/2). Other: 13/2− proposed in (^{20}Ne,pγ) is inconsistent.
10226 *3*	7/2#		Q	Additional information 117. Jπ: 4695γ to 3/2+ favors 7/2+, which however is disfavored by 10223γ to 1/2+.
10233 *3*	5/2#		Q	Additional information 118. Jπ: 10233γ to 1/2+; D γ to 3/2+; γ to 5/2+.
10267 *3*	3/2#		k Q	XREF: k(10270). Additional information 119.
10271 *3*	3/2#		k Q	XREF: k(10270). Additional information 120.
10287 *3*	5/2#		Q	Additional information 121.
10304 *3*	3/2#		k Q	XREF: k(10270). Additional information 122. Jπ: D+Q γ rays to 1/2+ and 5/2+.
10335 *3*	3/2#		Q	Additional information 123.
10385 *3*	5/2#		Q	Additional information 124.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$ b	XREF	Comments
10401 *3*	5/2#		Q	Additional information 125.
10425 *3*	(1/2,3/2)#		Q	Additional information 126.
10455 *3*			Q	Additional information 127.
10483 *3*	5/2#		Q	Additional information 128.
10485 *3*	3/2#		Q	Additional information 129.
10487 *3*	3/2#		Q	Additional information 130.
10503 *3*		16 keV	Q	Additional information 131.
10512 *20*			Q	
10520.16 *23*	(15/2+)	0.67 ps *7*	D G	Jπ: 1815.2γ ΔJ=1 to (13/2−); 3078.1γ to 11/2+. 15/2+ proposed in (^{16}O,2αpγ) but 15/2(−) in (^{20}Ne,pγ) is inconsistent. $T_{1/2}$: from DSAM in (^{16}O,2αpγ).
10537 *3*	3/2#		Q	Additional information 132.
10564 *3*	3/2#		Q	Additional information 133.
10607 *3*	3/2#		Q	Additional information 134.
10620 *3*			Q	Additional information 135.
10629 *3*			Q	Additional information 136.
10645 *3*	3/2#		Q	Additional information 137. Jπ: D+Q γ to 1/2+.
10650 *3*	3/2#		Q	Additional information 138.
10659 *3*	3/2#	24 keV	Q	Additional information 139.
10672 *3*	5/2#		Q	Additional information 140.
10698 *3*	3/2#		Q	Additional information 141.
10703 *3*	3/2#		Q	Additional information 142. Jπ: D+Q γ to 1/2+.
10706 *3*	3/2#		Q	Additional information 143.
10717 *3*			Q	Additional information 144. Jπ: γ to 1/2+.
10758 *3*			Q	Additional information 145. Jπ: γ to 3/2+.
10759.4 *3*	(15/2−)		G	Jπ: 3934.6γ ΔJ=2 to 11/2−; 15/2− proposed in (^{16}O,2αpγ).
10774 *3*	3/2#		Q	XREF: Others: AA XREF: aa(10800). Additional information 146. Jπ: D γ to 1/2+.
10792 *3*			Q	XREF: Others: AA XREF: aa(10800). Additional information 147.
10801 *3*	3/2#		Q	XREF: Others: AA XREF: aa(10800). Additional information 148.
10818 *3*	3/2#		Q	XREF: Others: AA XREF: aa(10800). Additional information 149.
10834 *3*	3/2#		Q	XREF: Others: AA XREF: aa(10800). Additional information 150.
10846 *3*	(1/2,3/2)#		Q	XREF: Others: AA XREF: aa(10800). Additional information 151. E(level): likely a doublet from (p,γ).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
10857 *3*			Q	Additional information 152.
10882 *3*	3/2[#]		Q	Additional information 153.
10907 *3*			Q	Additional information 154. E(level): likely a doublet from (p,γ).
10936 *3*			Q	Additional information 155. E(level): likely a doublet from (p,γ).
10948 *3*	3/2[#]		Q	Additional information 156.
10980 *3*			Q	Additional information 157.
11018 *20*			Q	
11041 *20*			Q	
11075 *3*	3/2[#]		Q	Additional information 158.
11080 *3*			Q	Additional information 159.
11119 *3*		<20 keV	I Q	Additional information 160. $T_{1/2}$: from (α,p):resonances.
11135 *3*	3/2[#]		Q	Additional information 161.
11152 *3*			Q	Additional information 162.
11162 *4*		<20 keV	I	$T_{1/2}$: from (α,p):resonances.
11173 *3*	5/2[#]	<20 keV	I Q	Additional information 163. $T_{1/2}$: from (α,p):resonances.
11236 *4*		<20 keV	I Q	E(level),$T_{1/2}$: from (α,p):resonances. Other: 11221 *20* from (p,γ).
11255 *4*		<6 keV	I Q	
11274 *20*			Q	
11282 *4*	3/2[&]	<8 keV	I Q	XREF: Q(11285). $T_{1/2}$: from (α,p):resonances.
11296.98 *25*	(17/2$^+$)	1.32 ps *14*	D G	J^π: 776.8γ M1+E2, ΔJ=1 to (15/2$^+$); 17/2$^+$ proposed in (^{16}O,2αpγ) but 17/2$^-$ in (^{20}Ne,pγ) is inconsistent. $T_{1/2}$: from DSAM in (^{16}O,2αpγ).
11307 *4*		<6 keV	I Q	E(level),$T_{1/2}$: from (α,γ):resonances.
11317 *4*	(3/2,7/2$^-$,9/2$^-$)[&]	<6 keV	I	E(level),$T_{1/2}$: from (α,γ):resonances.
11334 *20*			Q	
11345 *20*			Q	
11364 *4*		<8 keV	I Q	XREF: Q(11363). E(level),$T_{1/2}$: from (α,γ):resonances.
11400 *4*		<8 keV	I Q	XREF: Q(11392). E(level),$T_{1/2}$: from (α,γ):resonances.
11410 *4*		<8 keV	I	E(level),$T_{1/2}$: from (α,γ):resonances.
11421 *4*		<5 keV	I	E(level),$T_{1/2}$: from (α,γ):resonances.
11437 *4*		<8 keV	I	E(level),$T_{1/2}$: from (α,γ):resonances.
11445 *4*		<8 keV	I	
11467 *4*		<8 keV	I	
11494 *4*		<5 keV	I	
11571 *4*		<8 keV	I	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF		Comments
11605 *4*	3/2[&]	10 keV *5*	I		
11648 *4*		<5 keV	I		
11654 *4*	(7/2$^-$,9/2$^+$)[&]	<5 keV	I		
11665 *4*		<5 keV	I		
11689 *4*		<5 keV	I		
11718 *4*		<5 keV	I		
11723 *4*		<10 keV	I		
11733 *4*	3/2[&]	<5 keV	I		
11733.8 *4*	(15/2$^+$)		G		Jπ: 5280.3γ ΔJ=2 to 11/2$^+$; 1516.8γ ΔJ=0 to (15/2)$^-$.
11757 *4*		<5 keV	I		
11778 *4*		<15 keV	I		
11788 *4*		<5 keV	I		
11797 *4*		<5 keV	I		
11804 *4*		<5 keV	I		
11825 *4*		<5 keV	I		
11846 *4*		<5 keV	I		
11861 *4*		8 keV *4*	I		
11873 *2*		<5 keV	HI		Additional information 164. E(level): from (α,γ):resonances. Other: 11871 *4* from (α,p):resonances.
11877 *4*		<5 keV	I		
11902 *4*		13 keV *5*	I		
11917 *4*		<5 keV	I		
11929 *2*	3/2[&]	<5 keV	HI		XREF: I(11931). Additional information 165.
11933 *4*		<5 keV	I		
11942 *4*		<5 keV	I		
11956 *4*		<10 keV	I		
11981 *4*		<8 keV	I		
12002 *4*	(3/2,7/2$^-$)[&]	<6 keV	I		
12008 *4*		<5 keV	I		
12016 *4*		<5 keV	I		
12024 *4*		<10 keV	I		
12028 *4*	(3/2,7/2$^-$)[&]	<8 keV	I		
12042 *2*		<4 keV	I	S	E(level): weighted average of 12039 *4* from (α,p):resonances and 12043 *2* from (p,α):resonances. $T_{1/2}$: from (α,p):resonances. Other: <5 keV from (p,α):resonances.
12052 *2*	3/2[&]	4 keV *2*	I	S	E(level): weighted average of 12050 *4* from (α,p):resonances and 12053 *2* from (p,α):resonances. $T_{1/2}$: from (p,α):resonances. Other: <5 keV from (α,p):resonances.
12067 *4*		<5 keV	I		
12071 *2*		4 keV *3*	I	S	E(level): from (p,α):resonances. Other: 12072 *4* from (α,p):resonances. $T_{1/2}$: weighted average of 10 keV *4* (α,p):res, 3 keV *2* (p,α):res.
12078 *2*		<4 keV	HI	S	Additional information 166. E(level): from (p,α):res. Others: 12077 *2* from (α,γ):res, 12078 *4* from (α,p):res. $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF		Comments
12092.4 *10*	7/2−[&]	<3 keV	I	S	E(level),$T_{1/2}$: from (α,p):res. Other: 12091 *2*, Γ<3 keV from (p,α):res.
12104 *4*		<6 keV	I		
12114 *4*		6 keV *3*	I		
12126 *4*	9/2+[&]	<5 keV	I		
12132 *2*		<20 keV		S	
12142 *4*		<5 keV	I		
12155 *2*		<5 keV	HI		Additional information 167. E(level): from (α,γ):res. Other: 12151 *4* from (α,p):res. $T_{1/2}$: from (α,p):res.
12159 *2*		<4 keV	I	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12160 *4*, Γ<5 keV from (α,p):res.
12168 *4*		4 keV *2*	I		
12170.6 *24*			D		
12176 *2*		<4 keV		S	
12181 *3*		6 keV *3*	I	S	E(level): weighted average of 12187 *4* from (α,p):res and 12180 *2* from (p,α):res. $T_{1/2}$: from (α,p):res. Other: <10 keV from (p,α):res.
12204 *2*	11/2−[&]	<3 keV	HI	S	Additional information 168. E(level): from (α,γ). Others: 12202 *4* from (α,p):res, 12200 *2* from (p,α):res. $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.
12207 *2*		<5 keV	I	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12208 *4*, Γ<5 keV from (α,p):res.
12221.8 *10*		4 keV *2*	HI	S	Additional information 169. E(level): from (α,γ):res. Other: 12219 *2* from (p,α):res. $T_{1/2}$: from (p,γ):res. Other: <5 keV from (α,p):res.
12235 *2*	(5/2+,7/2,9/2+)	<4 keV	Hi	S	XREF: i(12237). Additional information 170. $T_{1/2}$: from (p,α):res.
12238 *2*		<10 keV	i	S	XREF: i(12237). $T_{1/2}$: from (p,α):res.
12255 *3*		8 keV *4*	I	S	E(level): weighted average of 12250 *4* from (α,p):res and 12256 *2* from (p,α):res. $T_{1/2}$: weighted average of 7 keV *4* from (α,p):res and 8 keV *4* from (p,α):res.
12264 *2*		7 keV *4*	I	S	E(level): from (p,α):res. Other: 12266 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: 12266 *4* from (p,α):res.
12274 *2*		<10 keV	I	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12277 *4*, Γ<10 keV from (α,p):res.
12283 *2*		<10 keV		S	
12293 *4*		<10 keV	I	s	XREF: s(12291).
12294 *4*		<5 keV	I	s	XREF: s(12291).
12302 *2*		<8 keV	I	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12303 *4*, Γ<8 keV from (α,p):res.
12311 *2*		<5 keV	HI	S	Additional information 171. E(level): from (α,γ):res. Others: 12310 *4* from (α,p), 12308 *2* from (p,α).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF	Comments
				$T_{1/2}$: from (p,α):res. Other: <8 keV from (α,p):res.
12313 *4*		<5 keV	I	
12329 *2*	$5/2^{-}$[&]	6 keV *3*	HI S	Additional information 172. E(level): from (α,γ):res. Others: 12333 *4* from (α,p), 12331 *2* from (p,α). $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.
12355 *4*		<10 keV	I	
12365 *4*		<6 keV	I	
12380 *2*	(5/2 to 11/2)	<5 keV	HI	Additional information 173. E(level): from (α,γ):res. Other: 12376 *4* from (α,p):res. $T_{1/2}$: from (α,p):res.
12386 *2*		<3 keV	HI S	Additional information 174. E(level): from (α,γ). Others: 12386 *4* from (α,p):res, 12385 *2* from (p,α):res. $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.
12393 *2*		<3 keV	I S	E(level): from (p,α):res. Other: 12394 *4* from (α,p):res. $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.
12404 *4*		<5 keV	I k	XREF: k(12410).
12420 *2*		<5 keV	HI k S	XREF: k(12410). Additional information 175. E(level): from (α,γ):res. Others: 12418 *4* from (α,p):res, 12418 *2* from (p,α):res. $T_{1/2}$: from (α,p):res and (p,α):res.
12428 *2*		4 keV *2*	I S	E(level): from (p,α):res. Other: 12430 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: <5 keV from (p,α):res.
12434 *2*		<4 keV	I S	E(level): from (p,α):res. Other: 12434 *4* from (α,p):res. $T_{1/2}$: from (p,α):res. Other: <7 keV from (α,p):res.
12447 *2*	$7/2^{-}$[&]	<3 keV	HI S	Additional information 176. E(level): from (α,γ):res and (p,α):res. Other: 12447 *4* from (α,p):res. $T_{1/2}$: from (p,α):res. Other: <5 keV from (α,p):res.
12458 *2*		<5 keV	HI S	Additional information 177. E(level): from (α,γ):res and (p,α):res. Other: 12459 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: <10 keV from (p,α):res.
12481 *2*		<5 keV	HI S	Additional information 178. E(level): from (α,γ):res. Others: 10482 *2* from (p,α):res, 12459 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: <8 keV from (p,α):res.
12496 *2*		13 keV *2*	HI S	XREF: Others: AD XREF: ad(12500). Additional information 179. E(level): weighted average of 12496 *2* from

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[b]	XREF		Comments
					(α,γ):res, 12495 *2* from (p,α):res, and 12494 *4* from (α,p):res. $T_{1/2}$: weighted average of 15 keV *4* from (α,p):res and 12 keV *2* from (p,α):res.
12509 *2*		6 keV *3*	I	S	XREF: Others: AD XREF: ad(12500). E(level): from (p,α):res. Other: 12511 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: <12 keV from (p,α):res.
12529 *2*		<5 keV	I	S	E(level): from (p,α):res. Other: 12530 *4* from (α,p):res. $T_{1/2}$: from (α,p):res. Other: <8 keV from (p,α):res.
12542 *4*		9 keV *4*	I		
12549 *2*		<5 keV	HI		Additional information 180. E(level): from (α,γ):res. Other: 12550 *4* from (α,p):res. $T_{1/2}$: from (α,p):res.
12563 *2*		<8 keV		S	
12577 *2*		<8 keV		S	
12589 *2*		<6 keV		S	
12629 *2*	(3/2,5/2$^-$,7/2)[a]	<6 keV		S	
12643 *2*	5/2$^{(-)}$[a]	4 keV *2*		S	
12660 *2*		<14 keV		S	
12683 *2*		10 keV *3*	H	S	E(level): from (p,α):res. Other: 12682 *6* from (α,γ):res.
12743 *2*		8 keV *2*		S	
12757 *2*		<6 keV		S	
12765 *2*		<8 keV		S	
12786 *2*		<10 keV	k	S	XREF: k(12790).
12794 *2*		<6 keV	k	S	XREF: k(12790).
12806 *2*	(3/2$^+$,7/2$^-$)[a]	6 keV *3*	H	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12807 *6* from (α,γ):res.
12830 *2*	3/2[a]	<3 keV		S	
12858 *2*		12 keV *5*		S	
12881 *2*		17 keV *5*	H	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12875 *6* from (α,γ):res.
12887 *2*		5 keV *3*		S	
12914 *2*		<8 keV		S	
12937 *2*		<6 keV		S	
12948 *2*		4 keV *2*		S	
12964 *2*		<8 keV		S	
12979 *2*		<6 keV	H	S	E(level),$T_{1/2}$: from (p,α):res. Other: 12980 *6* from (α,γ):res.
12989 *2*		<10 keV		S	
12995 *2*		<6 keV	H	S	E(level),$T_{1/2}$: from (p,α):res. Other: 13001 *6* from (α,γ):res.
13012 *2*		<8 keV		S	
13036 *2*		<8 keV		S	
13060 *2*		<4 keV		S	
13067 *2*		8 keV *2*	h	S	XREF: h(13074). E(level),$T_{1/2}$: from (p,α):res.
13076 *2*		<5 keV	h	S	XREF: h(13074). E(level),$T_{1/2}$: from (p,α):res.
13084 *6*			H		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$[b]	XREF	Comments
13099 *2*	$(5/2^-,7/2^-)$[a]	5 keV *2*	h S	XREF: h(13105).
13107 *2*	$(3/2^+,7/2^-)$[a]	<6 keV	h S	XREF: h(13105).
13121 *2*		6 keV *3*	S	
13146 *2*		8 keV *4*	S	
13159 *2*		<10 keV	S	
13171 *2*		<3 keV	k S	XREF: k(13180).
13183 *6*			H k	XREF: k(13180).
13194 *6*			H	
13225 *6*			H	
13246 *6*			H	
13298 *6*			H	
13319 *6*			H	
13340 *6*			H	
13366 *6*			H	
13486 *6*			H	
13497 *6*			H	
13502 *6*			H	
13518 *6*			H	
13523 *6*			H	
13528 *6*			H	
13539 *6*			H	
13549 *6*			H	
13591 *6*			H	
13601 *6*			H	
13607 *6*			H	
13622 *6*			H	
13638 *6*			H	
13643 *6*			H	
13654 *6*			H	
13669 *6*			H	
13675 *6*			H	
13706 *6*			H	
13711 *6*			H	
13716 *6*			H	
13727 *6*			H	
13732 *6*			H	
13742 *6*			H	
13753 *6*			H	
13769 *6*			H	
13779 *6*			H	
13800 *6*			H	
13805 *6*			H	
13816 *6*			H	
13836 *6*			H	
13842 *6*			H	
13852 *6*			H	
13857 *6*			H	
13863 *6*			H	
13873 *6*			H	
13878 *6*			H	
13879.2 *9*	$(19/2^+)$		G	J^π: $19/2^+$ proposed in (^{16}O,2αpγ).
13889 *6*			H	
13899 *6*			H	
13910 *6*			H	
13920 *6*			H	
13925 *6*			H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

E(level)†	XREF	E(level)†	XREF
13931 *6*	H	14714 *6*	H
13936 *6*	H	14725 *6*	H
13951 *6*	H	14740 *6*	H
14004 *6*	H	14824 *6*	H
14014 *6*	H	14845 *6*	H
14051 *6*	H	14855 *6*	H
14056 *6*	H	14866 *6*	H
14082 *6*	H	14871 *6*	H
14103 *6*	H	14876 *6*	H
14145 *6*	H	14881 *6*	H
14176 *6*	H	14887 *6*	H
14187 *6*	H	14897 *6*	H
14197 *6*	H	14902 *6*	H
14207 *6*	H	14923 *6*	H
14213 *6*	H	14939 *6*	H
14218 *6*	H	14955 *6*	H
14223 *6*	H	15012 *6*	H
14244 *6*	H	15017 *6*	H
14254 *6*	H	15023 *6*	H
14275 *6*	H	15028 *6*	H
14281 *6*	H	15033 *6*	H
14291 *6*	H	15049 *6*	H
14296 *6*	H	15054 *6*	H
14317 *6*	H	15059 *6*	H
14338 *6*	H	15075 *6*	H
14349 *6*	H	15080 *6*	H
14354 *6*	H	15085 *6*	H
14396 *6*	H	15090 *6*	H
14401 *6*	H	15122 *6*	H
14427 *6*	H	15127 *6*	H
14432 *6*	H	15148 *6*	H
14443 *6*	H	15153 *6*	H
14453 *6*	H	15164 *6*	H
14458 *6*	H	15169 *6*	H
14505 *6*	H	15174 *6*	H
14547 *6*	H	15179 *6*	H
14578 *6*	H	15185 *6*	H
14594 *6*	H	15200 *6*	H
14620 *6*	H	15211 *6*	H
14646 *6*	H	15216 *6*	H
14693 *6*	H	15221 *6*	H
14704 *6*	H		

† From ^{30}Si(p,γ) based on de-excitation γ-rays and proton energies where Eγ (without ΔEγ) are adopted from (p,γ), from a least-squares fit to Eγ (with ΔEγ) values for other levels with de-exciting transitions, and from particle-transfer reactions where no Eγ data, unless otherwise noted.

‡ For L-assignments target $J^\pi=1/2^+$ for ^{29}Si in (^{3}He,p); $J^\pi=3/2^+$ for ^{33}S target in (p,^{3}He) and 0^+ for (α,p), (^{3}He,d) and (p,α) reactions; for levels populated in high-spin reactions, spins generally increase with increasing energies.

Spin from (p,γ), based on $\gamma(\theta)$ and $\gamma\gamma(\theta)$, and RUL for strong transitions where measured $T_{1/2}$ is also available in (p,γ).

@ From R-Matrix analysis of experimental cross sections for resonances observed in ^{30}Si(p,p):resonances (1976Ou01).

& From measured p(θ) data in (α,p):resonances.

a From measured $\alpha(\theta)$ data in (p,α):resonances.

b Γ are from ^{30}Si(p,p):resonances and/or ^{30}Si(p,γ):resonances, except as noted. Lifetimes are from DSAM, mainly from (α,γ) (for 18 levels below 8400 keV); (α,pγ) (for 29 levels below 7500 keV); (p,γ) (for 25 levels below 9100 keV); (n,n$'\gamma$) (for 7

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{31}P Levels (continued)

levels below 5600 keV). In addition B(E2) values are available for first two excited states in Coul. ex and several levels below 6600 from (e,e′). Widths for six levels (below 8300 keV) are also available from (γ,γ').

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
1266.08	$3/2^+$	1266.1[&] *1*	100[&]	0.0	$1/2^+$	M1+E2	+0.26 *3*	3.32×10^{-5} *5*	B(M1)(W.u.)=0.0199 *10*; B(E2)(W.u.)=3.7 *+9−8* α(K)=1.681×10^{-5} *24*; α(L)=1.252×10^{-6} *18*; α(M)=9.51×10^{-8} *14* α(IPF)=1.509×10^{-5} *23* E_γ: others: 1266.4 *5* from (^{12}C,αpγ) and 1266.1 *4* from (^{16}O,2αpγ). δ: weighted average of +0.28 *2* from (p,γ), +0.20 *3* from (γ,γ'), and +0.25 *15* from (p,p$'\gamma$), all from $\gamma(\theta)$ or $\gamma\gamma(\theta)$. Other: 0.34 *3* from adopted B(E2)↑=0.070 *8* and $T_{1/2}$=511 fs *24*.
2233.63	$5/2^+$	967.6[a] *3*	2.73[a] *19*	1266.08	$3/2^+$	[M1,E2]			E_γ,I_γ: others: Iγ<0.1 in (α,pγ), <0.2 in (p,γ). If M1, B(M1)(W.u.)=0.0025 *+5−4*. If E2, B(E2)(W.u.)=12.0 *+25−18*.
		2233.6[&] *1*	100 *15*	0.0	$1/2^+$	E2		0.000436 *6*	B(E2)(W.u.)=6.69 *+48−44* α(K)=6.92×10^{-6} *10*; α(L)=5.15×10^{-7} *7*; α(M)=3.91×10^{-8} *5* α(IPF)=0.000429 *6* E_γ: others: 2234.2 *7* from (^{12}C,αpγ) and 2233.5 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ).
3134.3	$1/2^+$	900.5[c]	<0.21	2233.63	$5/2^+$				
		1868.1	2.78 *31*	1266.08	$3/2^+$	[M1,E2]		0.000231 *30*	α(K)=9.0×10^{-6} *6*; α(L)=6.7×10^{-7} *4*; α(M)=5.09×10^{-8} *32* α(IPF)=0.000221 *29* I_γ: other: <5.9 from ^{31}S ε decay. If M1, B(M1)(W.u.)=0.0129 *+16−15*. If E2, B(E2)(W.u.)=16.4 *+21−20*.
		3134.1	100.0 *3*	0.0	$1/2^+$	(M1)		0.000717 *10*	B(M1)(W.u.)=0.098 *+6−5* α(K)=3.78×10^{-6} *5*; α(L)=2.81×10^{-7} *4*; α(M)=2.134×10^{-8} *30* α(IPF)=0.000713 *10* E_γ: other: 3133 *5* from (γ,γ'). I_γ: other: 100.0 *28* from ^{31}S ε decay. Mult.: D+Q with multiple δ(Q/D) values from $\gamma(\theta)$ in (p,γ'), but 1/2 to 1/2 transition should be pure dipole; M1 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
3294.90	$5/2^+$	1061.5 *2*	26.7 *13*	2233.63	$5/2^+$	M1+E2	+0.40 *6*		B(M1)(W.u.)=0.039 *+10−7*; B(E2)(W.u.)=25 *+10−7* E_γ: weighted average of 1061.6 *2* from (^{20}Ne,pγ),

$^{31}_{15}P_{16}$-27

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									1061.9 *5* from (^{12}C,αpγ), and 1061.0 *3* from (^{16}O,2αpγ). I_γ: weighted average of 28.6 *23* from (^{20}Ne,pγ), 38 *10* from (^{12}C,αpγ), 28.2 *12* from (^{16}O,2αpγ), 19.1 *24* from (α,γ):resonances, 24 *6* from (α,pγ), and 26.5 *13* from (p,γ). δ: weighted average of +0.41 *6* from (p,γ) and +0.38 *9* from (α,pγ).
3294.90	5/2$^+$	2028.8[&] *2*	100.0 *13*	1266.08	3/2$^+$	M1+E2	+0.42 *2*	0.000276 *4*	B(M1)(W.u.)=0.021 *+5–4*; B(E2)(W.u.)=3.9 *+10–7* α(K)=7.51×10^{-6} *11*; α(L)=5.59×10^{-7} *8*; α(M)=4.25×10^{-8} *6* α(IPF)=0.000268 *4* E_γ: others: 2028.9 *6* from (^{12}C,αpγ) and 2028.6 *4* from (^{16}O,2αpγ). I_γ: others: 100 *6* from (^{20}Ne,pγ), 100 *14* from (^{12}C,αpγ), 100.0 *35* from (^{16}O,2αpγ), 100.0 *24* from (α,γ):resonances, and 100 *6* from (α,pγ). δ: weighted average of +0.44 *2* (1966Ha20) and +0.42 *4* (1969Wo01) from (p,γ), and +0.37 *3* from (α,pγ).
		3294.4 *7*	1.20 *19*	0.0	1/2$^+$	[E2]		0.000912 *13*	B(E2)(W.u.)=0.028 *+8–6* α(K)=3.67×10^{-6} *5*; α(L)=2.73×10^{-7} *4*; α(M)=2.075×10^{-8} *29* α(IPF)=0.000908 *13* E_γ: weighted average of 3293.6 *12* from (^{12}C,αpγ) and 3294.7 *7* from (^{16}O,2αpγ). I_γ: weighted average of 1.08 *19* from (^{16}O,2αpγ) and 1.41 *26* from (p,γ).
3414.58	7/2$^+$	1181.0 *2*	2.97 *27*	2233.63	5/2$^+$	M1+E2[@]	−0.35 *7*	2.57×10^{-5} *5*	B(M1)(W.u.)=0.0017 *+7–4*; B(E2)(W.u.)=0.64 *+38–25* α(K)=1.94×10^{-5} *4*; α(L)=1.443×10^{-6} *27*; α(M)=1.097×10^{-7} *21* α(IPF)=4.74×10^{-6} *12* E_γ: weighted average of 1180.9 *2* from (^{20}Ne,pγ) and 1181.1 *3* from (^{16}O,2αpγ). I_γ: weighted average of 2.6 *4* from (^{20}Ne,pγ), 3.20 *27* from (^{16}O,2αpγ), 4.2 *11* from (α,pγ), and 2.5 *5* from (p,γ).
		2148.4[&] *1*	100.0 *5*	1266.08	3/2$^+$	E2		0.000395 *6*	B(E2)(W.u.)=9.9 *+38–21* α(K)=7.41×10^{-6} *10*; α(L)=5.51×10^{-7} *8*; α(M)=4.19×10^{-8}

$^{31}_{15}P_{16}$-28

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									6 α(IPF)=0.000387 *5* E_γ: others: 2148.3 *8* from (^{12}C,αpγ) and 2148.6 *4* from (^{16}O,2αpγ). I_γ: others: 100 *4* from (^{16}O,2αpγ) and 100.0 *11* from (α,pγ). Mult.: Q with ΔJ=2 from γγ(DCO) in (^{20}Ne,pγ), (^{12}C,αpγ) and (^{16}O,2αpγ); M2 ruled out by RUL.
3414.58	7/2$^+$	3414.4[c]	<0.8	0.0	1/2$^+$	[M3]		0.000457 *6*	α(K)=6.27×10^{-6} *9*; α(L)=4.66×10^{-7} *7*; α(M)=3.55×10^{-8} *5* α(IPF)=0.000450 *6* γ reported in (p,γ) only. B(M3)(W.u.)<6465 upper limit exceeds RUL=10.
3506.1	3/2$^+$	1272.3[c]	<8.8	2233.63	5/2$^+$	(M1(+E2))	+0.05 *11*	3.33×10^{-5} *5*	B(M1)(W.u.)<0.074; B(E2)(W.u.)<5.01 α(K)=1.639×10^{-5} *25*; α(L)=1.220×10^{-6} *19*; α(M)=9.27×10^{-8} *14* α(IPF)=1.560×10^{-5} *27* Mult.,δ: D(+Q) from (p,γ); M1(+E2) from Δπ, where parity assignments of connecting levels are uniquely established from independent arguments.
		2239.9	69 *6*	1266.08	3/2$^+$	(M1(+E2))	−0.06 *19*	0.000352 *7*	B(M1)(W.u.)=0.088 *25*; B(E2)(W.u.)<5.9 α(K)=6.31×10^{-6} *9*; α(L)=4.69×10^{-7} *7*; α(M)=3.57×10^{-8} *5* α(IPF)=0.000345 *7* I_γ: weighted average of 67 *11* from ^{31}S ε decay, 56 *6* from (α,pγ), and 75 *4* from (p,γ). Mult.,δ: D(+Q) from (p,γ); M1(+E2) from Δπ, where parity assignments of connecting levels are uniquely established from independent arguments.
		3505.9	100 *4*	0.0	1/2$^+$	M1+E2	+0.41 *3*	0.000878 *13*	B(M1)(W.u.)=0.0287 *+47−45*; B(E2)(W.u.)=1.74 *+37−35* α(K)=3.23×10^{-6} *5*; α(L)=2.400×10^{-7} *34*; α(M)=1.824×10^{-8} *26* α(IPF)=0.000874 *13* I_γ: from (p,γ). Others: 100 *6* from ^{31}S ε decay (2.5534 s) and 100 *6* from (α,pγ). δ: other: δ(Q/D)=+0.40 *3* from (α,pγ).
4191.01	5/2$^+$	895.9[c]	<0.7	3294.90	5/2$^+$				γ not reported in (^{16}O,2αpγ).
		1957.2[a] *6*	33.5 *26*	2233.63	5/2$^+$	(M1(+E2))	+0.09 *14*	0.000237 *4*	B(M1)(W.u.)=0.15 *+14−6*; B(E2)(W.u.)<16 α(K)=7.84×10^{-6} *12*; α(L)=5.83×10^{-7} *9*;

$^{31}_{15}P_{16}$-29

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(M)=4.43×10^{-8} *7* α(IPF)=0.000229 *4* I_γ: weighted average of 37 *4* from (^{16}O,2αpγ), 31.6 *26* from (α,γ):resonances, 32 *4* from (α,pγ), and 34.7 *28* from (p,γ). Mult.,δ: D(+Q) from (α,pγ); M1(+E2) from Δπ, where parity assignments of connecting levels are uniquely established from independent arguments.
4191.01	5/2$^+$	2924.7[a] *6*	100.0 *26*	1266.08	3/2$^+$	M1+E2[@]	−0.12 *5*	0.000637 *9*	B(M1)(W.u.)=0.13 *+10−4*; B(E2)(W.u.)=1.0 *+14−7* α(K)=4.19×10^{-6} *6*; α(L)=3.11×10^{-7} *4*; α(M)=2.366×10^{-8} *33* α(IPF)=0.000632 *9* I_γ: from (α,γ):resonances. Others: 100 *7* from (^{16}O,2αpγ), 100 *5* from (α,pγ), and 100.0 *28* from (p,γ). δ: others: −0.25 *3* or −1.7 *4* from (p,γ).
4260.4	3/2$^+$	4190.6[c]	<2.1	0.0	1/2$^+$				γ not reported in (^{16}O,2αpγ).
		965.4[c]	<0.7	3294.90	5/2$^+$				
		1126.1[c]	<1.4	3134.3	1/2$^+$				
		2994.1	45 *11*	1266.08	3/2$^+$	M1+E2	+0.25 *5*	0.000670 *10*	B(M1)(W.u.)=0.023 *+15−8*; B(E2)(W.u.)=0.7 *+6−3* α(K)=4.05×10^{-6} *6*; α(L)=3.01×10^{-7} *4*; α(M)=2.291×10^{-8} *32* α(IPF)=0.000666 *10* I_γ: unweighted average of 56 *6* from (α,pγ) and 34.8 *20* from (p,γ).
		4260.1	100.0 *20*	0.0	1/2$^+$	M1+E2	+0.35 *4*	1.13×10^{-3} *2*	B(M1)(W.u.)=0.017 *+11−5*; B(E2)(W.u.)=0.50 *+36−17* α(K)=2.449×10^{-6} *34*; α(L)=1.820×10^{-7} *26*; α(M)=1.383×10^{-8} *19* α(IPF)=0.001126 *16* I_γ: from (p,γ). Other: 100 *6* from (α,pγ). δ: weighted average of +0.40 *6* from (α,pγ) and +0.32 *4* from (p,γ).
4430.84	7/2$^-$	239.8[a] *2*	1.40[a] *27*	4191.01	5/2$^+$	[E1]			B(E1)(W.u.)=0.00087 *+19−18* E_γ,I_γ: from (^{16}O,2αpγ) only.
		1016.4[&] *1*	8.4 *11*	3414.58	7/2$^+$	(E1)			B(E1)(W.u.)=6.8×10^{-5} *+11−10* E_γ: others: 1016.5 *5* from (^{12}C,αpγ) and 1016.4 *2* from (^{16}O,2αpγ). I_γ: weighted average of 8.4 *14* from (^{20}Ne,pγ), 8.6 *11*

$^{31}_{15}P_{16}$-30

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[#]	α[†]	Comments
								from (^{16}O,2αpγ), 7.3 *18* from (α,γ):resonances, 7.7 *28* from (p,γ), and 13 *5* from (α,pγ). Mult.: D with ΔJ=0 from $\gamma\gamma$(DCO) in (^{20}Ne,pγ), (^{12}C,αpγ), and (^{16}O,2αpγ); E1 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
4430.84	1135.7 *2*	74 *4*	3294.90	5/2$^+$	(E1+M2)	−0.04 *3*	3.75×10^{-5} *5*	B(E1)(W.u.)=4.30×10^{-4} *+38−34*; B(M2)(W.u.)=2.5 *+50−22* α(K)=1.274×10^{-5} *20*; α(L)=9.48×10^{-7} *15*; α(M)=7.20×10^{-8} *11* α(IPF)=2.376×10^{-5} *35* B(M2)(W.u.)=2.5 *+50−22* upper bound exceeds RUL=3. E_γ: weighted average of 1135.6 *2* from (^{20}Ne,pγ), 1136.4 *5* from (^{12}C,αpγ), and 1135.7 *3* from (^{16}O,2αpγ). I_γ: weighted average of 64 *4* from (^{20}Ne,pγ), 72 *10* from (^{12}C,αpγ), 87 *5* from (^{16}O,2αpγ), 75 *4* from (α,γ):resonances, and 76 *4* from (p,γ). Other: 109 *9* from (α,pγ) is discrepant. Mult.: D+Q and δ from $\gamma(\theta)$ in (p,γ); D with ΔJ=1 from $\gamma\gamma$(DCO) in (^{20}Ne,pγ), (^{12}C,αpγ), and (^{16}O,2αpγ); E1+M2 from level scheme.
	1296.9[c]	<0.189	3134.3	1/2$^+$	[E3]		4.80×10^{-5} *7*	α(K)=3.74×10^{-5} *5*; α(L)=2.79×10^{-6} *4*; α(M)=2.117×10^{-7} *30* α(IPF)=7.58×10^{-6} *11* γ not reported in (^{16}O,2αpγ). B(E3)(W.u.)<9235 upper limit exceeds RUL=100.
	2197.0[&] *2*	100[&] *3*	2233.63	5/2$^+$	(E1+M2)	−0.03 *2*	0.000782 *11*	B(E1)(W.u.)=8.0×10^{-5} *+7−6*; B(M2)(W.u.)=0.07 *+12−6* α(K)=4.46×10^{-6} *6*; α(L)=3.31×10^{-7} *5*; α(M)=2.52×10^{-8} *4* α(IPF)=0.000777 *11* E_γ: others: 2197.9 *9* from (^{12}C,αpγ) and 2197.0 *4* from (^{16}O,2αpγ). I_γ: from (^{20}Ne,pγ) and (^{16}O,2αpγ). Other: 100 *4* from (α,γ):resonances, 100 *9* from (α,pγ), and 100 *6* from (p,γ), 100 *15* from (^{12}C,αpγ). Mult.: D+Q and δ from $\gamma(\theta)$ in (p,γ); D with ΔJ=1 from $\gamma\gamma$(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); E1+M2 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
	3164.6[a] *7*	4.1 *10*	1266.08	3/2$^+$	[M2]		0.000516 *7*	B(M2)(W.u.)=0.51 *13* α(K)=5.26×10^{-6} *7*; α(L)=3.91×10^{-7} *5*; α(M)=2.97×10^{-8} *4* α(IPF)=0.000511 *7* I_γ: weighted average of 4.8 *11* from (^{16}O,2αpγ) and 3.6 *10* from (p,γ).

$^{31}_{15}P_{16}$-31

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
4430.84	7/2⁻	4431.0[a] *7*	1.66 *32*	0.0	1/2⁺	[E3]		1.02×10^{-3} *1*	B(E3)(W.u.)=13.1 *+28−26* α(K)=3.06×10^{-6} *4*; α(L)=2.275×10^{-7} *32*; α(M)=1.729×10^{-8} *24* α(IPF)=0.001019 *14* I_γ: weighted average of 1.51 *32* from (^{16}O,2αpγ) and 1.9 *4* from (p,γ).
4592.5	3/2⁺	1086.4[c]	<1.8	3506.1	3/2⁺				
		1177.9[c]	<0.9	3414.58	7/2⁺				
		1297.5[c]	<3.6	3294.90	5/2⁺				
		2358.6	32 *4*	2233.63	5/2⁺	[M1,E2]		0.00045 *5*	α(K)=6.06×10^{-6} *26*; α(L)=4.50×10^{-7} *19*; α(M)=3.42×10^{-8} *14* α(IPF)=0.00044 *5* I_γ: other: 31 *5* from (α,pγ). If M1, B(M1)(W.u.)=0.024 *+11−6*. If E2, B(E2)(W.u.)=19 *+9−5*.
		3326.2	100 *4*	1266.08	3/2⁺	M1+E2	−0.8 *4*	0.00084 *4*	B(M1)(W.u.)=0.016 *+10−6*; B(E2)(W.u.)=4.1 *+29−27* α(K)=3.52×10^{-6} *6*; α(L)=2.62×10^{-7} *5*; α(M)=1.99×10^{-8} *4* α(IPF)=0.00084 *4* I_γ: other: 100 *7* from (α,pγ). Mult.,δ: D+Q and δ from γ(θ) for a doubly-placed 3336γ in (α,pγ); E1+M2 ruled out by RUL.
		4592.1	39 *8*	0.0	1/2⁺	(M1+E2)		0.00129 *8*	α(K)=2.23×10^{-6} *4*; α(L)=1.659×10^{-7} *32*; α(M)=1.261×10^{-8} *25* α(IPF)=0.00129 *8* I_γ: unweighted average of 31 *5* from (α,pγ) and 46 *4* from (p,γ). Mult.,δ: D+Q with δ(Q/D)=−0.07 *4* or −1.48 *12* for 4630γ (1966Ha20) in (p,γ) may belong to this transition. If M1, B(M1)(W.u.)=0.0039 *+19−11*. If E2, B(E2)(W.u.)=0.83 *+39−24*.
4633.58	7/2⁺	1128.1[c]	<13.8	3506.1	3/2⁺	[E2]		3.19×10^{-5} *4*	B(E2)(W.u.)<48 α(K)=2.75×10^{-5} *4*; α(L)=2.049×10^{-6} *29*; α(M)=1.556×10^{-7} *22* α(IPF)=2.190×10^{-6} *31* γ not reported in (^{16}O,2αpγ).
		1218.8 *4*	100.0 *28*	3414.58	7/2⁺	M1+E2[@]	+0.33 *6*	2.84×10^{-5} *5*	B(M1)(W.u.)=0.055 *+14−10*; B(E2)(W.u.)=18 *+8−6* α(K)=1.822×10^{-5} *31*; α(L)=1.356×10^{-6} *23*; α(M)=1.030×10^{-7} *18* α(IPF)=8.70×10^{-6} *19*

$^{31}_{15}P_{16}$-32

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									E_γ: unweighted average of 1219.4 *1* from (^{20}Ne,pγ), 1218.2 *5* from (^{12}C,αpγ), and 1218.8 *3* from (^{16}O,2αpγ). I_γ: others: 100 *7* from (^{20}Ne,pγ), 100 *4* from (^{16}O,2αpγ), 100 *9* from (α,γ):resonances, 100 *5* from (α,pγ), 100 *42* from (^{12}C,αpγ). Mult.,δ: ΔJ=0 from γγ(DCO) in (^{20}Ne,pγ), (^{12}C,αpγ) and (^{16}O,2αpγ).
4633.58	7/2$^+$	1339.2 *4*	95 *4*	3294.90	5/2$^+$	M1+E2[@]	+0.38 *4*	4.49×10^{-5} *7*	B(M1)(W.u.)=0.038 *+10−7*; B(E2)(W.u.)=13.6 *+45−32* α(K)=1.542×10^{-5} *23*; α(L)=1.148×10^{-6} *17*; α(M)=8.72×10^{-8} *13* α(IPF)=2.83×10^{-5} *5* E_γ: weighted average of 1339.6 *3* from (^{20}Ne,pγ), 1338.6 *6* from (^{12}C,αpγ), and 1338.7 *4* from (^{16}O,2αpγ). I_γ: others: 101 *8* from (^{20}Ne,pγ), 70 *16* from (^{12}C,αpγ), 96 *8* from (^{16}O,2αpγ), and 92 *8* from (α,pγ); 167 *18* from (α,γ):resonances is discrepant.
		1499.9[c]	<5.5	3134.3	1/2$^+$	[M3]		5.07×10^{-5} *7*	α(K)=3.83×10^{-5} *5*; α(L)=2.86×10^{-6} *4*; α(M)=2.173×10^{-7} *30* α(IPF)=9.32×10^{-6} *13* γ not reported in (^{16}O,2αpγ). B(M3)(W.u.)<1.5×10^{7} upper limit exceeds RUL=10.
		2399.7[a] *5*	72 *3*	2233.63	5/2$^+$	(M1+E2)	+0.45 *6*	0.000435 *7*	B(M1)(W.u.)=0.0048 *+12−8*; B(E2)(W.u.)=0.75 *+27−20* α(K)=5.74×10^{-6} *8*; α(L)=4.27×10^{-7} *6*; α(M)=3.24×10^{-8} *5* α(IPF)=0.000429 *7* I_γ: weighted average of 68 *8* from (^{16}O,2αpγ), 88 *10* from (α,γ):resonances, 56 *10* from (α,pγ), and 72.7 *28* from (p,γ). Mult.,δ: D+Q and δ from pγ(θ) in (α,pγ); M1+E2 from level scheme.
		3367.6[a] *7*	8.4 *26*	1266.08	3/2$^+$	[E2]		0.000941 *13*	B(E2)(W.u.)=0.095 *+39−31* α(K)=3.55×10^{-6} *5*; α(L)=2.64×10^{-7} *4*; α(M)=2.007×10^{-8} *28* α(IPF)=0.000937 *13* I_γ: weighted average of 10 *4* from (^{16}O,2αpγ), 7.7 *26* from (α,pγ), and 8.3 *28* from (p,γ).
		4633.8[c]		0.0	1/2$^+$	[M3]		0.000785 *11*	α(K)=3.58×10^{-6} *5*; α(L)=2.66×10^{-7} *4*; α(M)=2.023×10^{-8} *28* α(IPF)=0.000781 *11* I_γ: <11 from (p,γ) but from RUL expected value is 0.015, thus this transition most likely does not occur. γ not seen in (^{16}O,2αpγ).
4784.7	5/2$^+$	1368.8[c]	<4.7	3414.58	7/2$^+$	[M1,E2]		5.7×10^{-5} *9*	α(K)=1.61×10^{-5} *17*; α(L)=1.20×10^{-6} *13*; α(M)=9.1×10^{-8} *10*

$^{31}_{15}P_{16}$-33

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(IPF)=3.9×10^{-5} *7* If M1, B(M1)(W.u)<0.045. If E2, B(E2)(W.u.)<106.
4784.7	5/2$^+$	1488.4	74 *5*	3294.90	5/2$^+$	(M1(+E2))	+0.04 *10*	7.38×10^{-5} *11*	B(M1)(W.u.)=0.30 *+28−12*; B(E2)(W.u.)<22 α(K)=1.243×10^{-5} *18*; α(L)=9.25×10^{-7} *13*; α(M)=7.03×10^{-8} *10* α(IPF)=6.04×10^{-5} *9* I_γ: weighted average of 74 *7* from (α,γ):resonances, 76 *9* from (α,pγ), and 73 *5* from (p,γ). Mult.,δ: D(+Q) and δ from (p,γ); M1+E2 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
		1649.1[c]	<2.4	3134.3	1/2$^+$	[E2]		0.0001636 *23*	B(E2)(W.u.)<22 α(K)=1.214×10^{-5} *17*; α(L)=9.04×10^{-7} *13*; α(M)=6.87×10^{-8} *10* α(IPF)=0.0001505 *21*
		2549.5	45 *5*	2233.63	5/2$^+$	(M1+E2)		0.00053 *5*	α(K)=5.34×10^{-6} *20*; α(L)=3.97×10^{-7} *15*; α(M)=3.02×10^{-8} *11* α(IPF)=0.00053 *5* I_γ: weighted average of 36 *7* from (α,γ):resonances, 41 *7* from (α,pγ), and 52 *5* from (p,γ). Mult.,δ: D+Q with δ(Q/D)=+0.18 *11* or −2.5 *20* from (p,γ); M1+E2 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments. If M1, B(M1)(W.u.)=0.036 *+24−11*. If E2, B(E2)(W.u.)=24 *+16−8*.
		3517.1	20 *9*	1266.08	3/2$^+$	[M1,E2]		0.00093 *7*	α(K)=3.26×10^{-6} *8*; α(L)=2.42×10^{-7} *6*; α(M)=1.84×10^{-8} *5* α(IPF)=0.00093 *7* I_γ: unweighted average of 29 *7* from (α,γ):resonances and 11 *4* from (p,γ). Other: ≤17 from (α,pγ). If M1, B(M1)(W.u.)=0.0060 *+49−28*. If E2, B(E2)(W.u.)=2.2 *+18−10*.
		4783.0	100 *4*	0.0	1/2$^+$	E2		1.43×10^{-3} *2*	B(E2)(W.u.)=2.3 *+15−7* α(K)=2.139×10^{-6} *30*; α(L)=1.589×10^{-7} *22*; α(M)=1.208×10^{-8} *17* α(IPF)=0.001424 *20* I_γ: others: 100 *7* from (α,γ):resonances and 100 *9* from (α,pγ).
5014.9	(3/2$^+$)	1508.8	4.2 *14*	3506.1	3/2$^+$	[M1,E2]		9.3×10^{-5} *14*	α(K)=1.33×10^{-5} *12*; α(L)=9.9×10^{-7} *9*; α(M)=7.5×10^{-8}

$^{31}_{15}P_{16}$-34

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									7 α(IPF)=7.9×10^{-5} *13* If M1, B(M1)(W.u.)=0.0048 *+27−18*. If E2, B(E2)(W.u.)=9 *+5−4*.
5014.9	(3/2$^+$)	1600.3[c]	<0.7	3414.58	7/2$^+$				
		1719.8	2.8 *14*	3294.90	5/2$^+$	[M1,E2]		0.000170 *24*	α(K)=1.04×10^{-5} *8*; α(L)=7.8×10^{-7} *6*; α(M)=5.9×10^{-8} *4* α(IPF)=0.000159 *23* If M1, B(M1)(W.u.)=0.0022 *+16−10*. If E2, B(E2)(W.u.)=3.3 *+24−15*.
		2781.0[c]	<1.4	2233.63	5/2$^+$				
		3748.5	32 *4*	1266.08	3/2$^+$	[M1,E2]		0.00101 *7*	α(K)=2.97×10^{-6} *7*; α(L)=2.21×10^{-7} *5*; α(M)=1.68×10^{-8} *4* α(IPF)=0.00101 *7* I_γ: other: 33 *7* from (α,pγ). If M1, B(M1)(W.u.)=0.0024 *+11−6*. If E2, B(E2)(W.u.)=0.75 *+34−19*.
		5014.5	100 *4*	0.0	1/2$^+$	(M1(+E2))	−0.2 *5*	0.00134 *5*	B(M1)(W.u.)=0.0030 *+18−15*; B(E2)(W.u.)<0.28 α(K)=1.959×10^{-6} *31*; α(L)=1.455×10^{-7} *23*; α(M)=1.106×10^{-8} *17* α(IPF)=0.00134 *5* I_γ: other: 100 *7* from (α,pγ). Mult.,δ: D(+Q) and δ from (p,γ); (M1+E2) from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
5015.2	3/2$^-$	1509.1[c]	<1.7	3506.1	3/2$^+$				
		1600.6[c]	<3.4	3414.58	7/2$^+$				
		1720.1[c]	<5.1	3294.90	5/2$^+$				
		1880.8	3.4 *9*	3134.3	1/2$^+$	[E1]		0.000563 *8*	B(E1)(W.u.)=0.00030 *+34−14* α(K)=5.56×10^{-6} *8*; α(L)=4.14×10^{-7} *6*; α(M)=3.14×10^{-8} *4* α(IPF)=0.000557 *8*
		2781.3[c]	<1.7	2233.63	5/2$^+$				
		3748.8	100 *5*	1266.08	3/2$^+$	[E1]		1.58×10^{-3} *2*	B(E1)(W.u.)=0.0011 *+13−5* α(K)=2.224×10^{-6} *31*; α(L)=1.653×10^{-7} *23*; α(M)=1.256×10^{-8} *18* α(IPF)=0.001580 *22* I_γ: other: 100 *13* from (α,pγ).
		5014.8	46 *21*	0.0	1/2$^+$	[E1]		2.02×10^{-3} *3*	B(E1)(W.u.)=0.00021 *+23−11* α(K)=1.575×10^{-6} *22*; α(L)=1.170×10^{-7} *16*; α(M)=8.89×10^{-9} *12* α(IPF)=0.002023 *28*

$^{31}_{15}P_{16}$-35

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									I_γ: unweighted average of 25 *13* from (α,pγ) and 66 *5* from (p,γ). I_γ: Iγ from (α,pγ) is inconsistent.
5115.2	5/2$^+$	1609.9[c]	<8.0	3506.1	3/2$^+$				
		1701.3	25 *4*	3414.58	7/2$^+$	M1+E2[@]	+1.6 *11*	0.000173 *24*	B(M1)(W.u.)=0.015 *+27−9*; B(E2)(W.u.)=57 *+36−37* α(K)=1.10×10^{-5} *8*; α(L)=8.2×10^{-7} *6*; α(M)=6.2×10^{-8} *5* α(IPF)=0.000161 *23*
		1820.9	22 *4*	3294.90	5/2$^+$	[M1,E2]		0.000211 *28*	I_γ: weighted average of 21 *5* from (α,pγ) and 28 *4* from (p,γ). α(K)=9.4×10^{-6} *6*; α(L)=7.0×10^{-7} *5*; α(M)=5.33×10^{-8} *35* α(IPF)=0.000201 *27* If M1, B(M1)(W.u.)=0.037 *+26−13*. If E2, B(E2)(W.u.)=50 *+34−17*.
		1981.6[c]	<8.0	3134.3	1/2$^+$				
		2882.1	48 *4*	2233.63	5/2$^+$	M1+E2[@]	+0.65 *55*	0.00065 *4*	B(M1)(W.u.)=0.014 *+11−7*; B(E2)(W.u.)=3.2 *+42−27* α(K)=4.35×10^{-6} *9*; α(L)=3.23×10^{-7} *7*; α(M)=2.46×10^{-8} *5* α(IPF)=0.00065 *4* I_γ: weighted average of 40 *7* from (α,pγ) and 50 *4* from (p,γ). Mult.,δ: D+Q from p$\gamma(\theta)$ in (α,pγ); E1+M2 ruled out by RUL.
		3849.6	100 *6*	1266.08	3/2$^+$	M1+E2	+0.30 *6*	0.000992 *15*	B(M1)(W.u.)=0.016 *+11−5*; B(E2)(W.u.)=0.44 *+37−19* α(K)=2.82×10^{-6} *4*; α(L)=2.095×10^{-7} *29*; α(M)=1.592×10^{-8} *22* α(IPF)=0.000988 *15* I_γ: other: 100 *7* from (α,pγ). See comment for 3845γ from 6078 level.
		5115.5[c]	<10.0	0.0	1/2$^+$	[E2]		1.52×10^{-3} *2*	B(E2)(W.u.)<0.25 α(K)=1.951×10^{-6} *27*; α(L)=1.449×10^{-7} *20*; α(M)=1.102×10^{-8} *15* α(IPF)=0.001517 *21*
5256.8	1/2$^+$	825.6[c]	<3.0	4430.84	7/2$^-$	[E3]			B(E3)(W.u.)>11456 exceeds RUL=100.
		1750.6[c]	<3.0	3506.1	3/2$^+$				
		1842.1[c]	<3.0	3414.58	7/2$^+$	[M3]		7.34×10^{-5} *10*	α(K)=2.329×10^{-5} *33*; α(L)=1.737×10^{-6} *24*; α(M)=1.320×10^{-7} *18* α(IPF)=4.82×10^{-5} *7* B(M3)(W.u.)>1340 exceeds RUL=10.
		5256.3	100	0.0	1/2$^+$	(M1)		1.41×10^{-3} *2*	B(M1)(W.u.)≥0.014 α(K)=1.838×10^{-6} *26*; α(L)=1.366×10^{-7} *19*; α(M)=1.038×10^{-8} *15* α(IPF)=0.001404 *20* E_γ: other: 5255 *4* from (γ,γ'). Mult.: D from p$\gamma(\theta)$ in (α,pγ); M1 from level scheme.

$^{31}_{15}P_{16}$-36

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
5342.84	$9/2^+$	709.4[a] *2*	1.60[a] *24*	4633.58	$7/2^+$	[M1+E2]			B(M1)(W.u.)=0.021 *+9−5* B(E2)(W.u.)=1.8×10^2 *+8−5* exceeds RUL=100 if pure E2.
		1928.0[&] *1*	100.0 *25*	3414.58	$7/2^+$	(M1(+E2))	+0.04 *6*	0.0002250 *32*	B(M1)(W.u.)=0.064 *+32−18*; B(E2)(W.u.)<1.1 α(K)=8.03×10^{-6} *11*; α(L)=5.97×10^{-7} *8*; α(M)=4.54×10^{-8} *6* α(IPF)=0.0002163 *31* E_γ: others: 1927.8 *5* from (^{12}C,αpγ) and 1928.4 *4* from (^{16}O,2αpγ). I_γ: from (p,γ). Others: 100 *6* from (^{20}Ne,pγ), 100 *4* from (^{16}O,2αpγ), 100 *20* from (α,γ):resonances, and 100 *5* from (α,pγ). Mult.,δ: D(+Q) from p$\gamma(\theta)$ in (α,pγ); M1+E2 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
		2048.3[a] *4*	7.1 *14*	3294.90	$5/2^+$	E2		0.000347 *5*	B(E2)(W.u.)=4.0 *+19−11* α(K)=8.07×10^{-6} *11*; α(L)=6.00×10^{-7} *8*; α(M)=4.56×10^{-8} *6* α(IPF)=0.000338 *5* I_γ: weighted average of 8.6 *12* from (^{16}O,2αpγ), 9.8 *25* from (α,pγ), and 4.9 *12* from (p,γ). Other: 42 *16* from (α,γ):resonances is discrepant. Mult.: Q from $\gamma\gamma$(ADO) in (^{16}O,2αpγ) and p$\gamma(\theta)$ in (α,pγ); M2 ruled out by RUL.
		3110.2 *8*	13.8 *18*	2233.63	$5/2^+$	E2		0.000836 *12*	B(E2)(W.u.)=0.97 *+43−24* α(K)=4.01×10^{-6} *6*; α(L)=2.98×10^{-7} *4*; α(M)=2.268×10^{-8} *32* α(IPF)=0.000832 *12* E_γ: weighted average of 3110.9 *6* from (^{20}Ne,pγ) and 3109.4 *6* from (^{16}O,2αpγ). I_γ: unweighted average of 10.3 *11* from (^{20}Ne,pγ), 14.0 *9* from (^{16}O,2αpγ), 12.2 *25* from (α,pγ), and 18.5 *25* from (p,γ). Other: 58 *16* from (α,γ):resonances is discrepant. Mult.: Q from $\gamma\gamma$(ADO) in (^{16}O,2αpγ) and p$\gamma(\theta)$ in (α,pγ); M2 ruled out by RUL.
		4076.5[c]	<2.47	1266.08	$3/2^+$	[M3]		0.000640 *9*	α(K)=4.50×10^{-6} *6*; α(L)=3.35×10^{-7} *5*; α(M)=2.54×10^{-8} *4* α(IPF)=0.000635 *9* B(M3)(W.u.)<28117 upper limit exceeds RUL=10.
		5342.4[c]	<4.9	0.0	$1/2^+$	[E4]			B(E4)(W.u.)<2892585 upper limit exceeds RUL=100.
5530.0	$(5/2)^+$	1098.8[c]	<8.6	4430.84	$7/2^-$				

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
5530.0	$(5/2)^+$	2115.3	100 *11*	3414.58	$7/2^+$	M1+E2[@]	+1.0 *5*	0.000340 *24*	B(M1)(W.u.)=0.036 *+38−17*; B(E2)(W.u.)=35 *+29−23* α(K)=7.26×10^{-6} *23*; α(L)=5.40×10^{-7} *18*; α(M)=4.11×10^{-8} *13* α(IPF)=0.000332 *24* I_γ: from (α,pγ). Others: 100 *60* from (α,γ):resonances and 100 *14* from (p,γ).
		2234.9[c]	100 *14*	3294.90	$5/2^+$				
		3296.0	85 *11*	2233.63	$5/2^+$	M1+E2[@]	+0.12 *5*	0.000782 *11*	B(M1)(W.u.)=0.016 *+12−5*; B(E2)(W.u.)=0.09 *+13−6* α(K)=3.51×10^{-6} *5*; α(L)=2.61×10^{-7} *4*; α(M)=1.984×10^{-8} *28* α(IPF)=0.000778 *11* I_γ: from (α,pγ). Others: 100 *60* from (α,γ):resonances and 86 *14* from (p,γ).
		5529.5[c]	<14.3	0.0	$1/2^+$				
5558.9	$3/2^+$	3324.9	13.6 *23*	2233.63	$5/2^+$				
		4292.5[c]	<11.4	1266.08	$3/2^+$				
		5558.4	100.0 *23*	0.0	$1/2^+$				E_γ: other: 5559 *4* from (γ,γ').
5672.4	5/2	1241.2[c]	<20	4430.84	$7/2^-$				
		2257.7	13 *4*	3414.58	$7/2^+$				
		2377.3[c]	<1.3	3294.90	$5/2^+$				
		2538.0[c]	<1.3	3134.3	$1/2^+$				
		3438.4	16 *5*	2233.63	$5/2^+$	D			
		4405.9	100 *5*	1266.08	$3/2^+$	D+Q			δ: +0.04 *4* or +3.2 *5* from (p,γ).
		5671.8	2.6 *13*	0.0	$1/2^+$				
5772.7	$7/2^+$	1139.3	34 *12*	4633.58	$7/2^+$	[M1+E2]		2.8×10^{-5} *4*	B(M1)(W.u.)=0.08 *+6−3* α(K)=2.34×10^{-5} *34*; α(L)=1.75×10^{-6} *26*; α(M)=1.33×10^{-7} *20* α(IPF)=2.4×10^{-6} *5* I_γ: weighted average of 63 *25* from (α,γ):resonances, 20 *10* from (α,pγ), and 51 *14* from (p,γ). B(E2)(W.u.)=2.6×10^2 *+21−11* exceeds RUL=100 if pure E2.
		1513.1[c]	<11.4	4260.4	$3/2^+$	[E2]		0.0001090 *15*	B(E2)(W.u.)<52 α(K)=1.444×10^{-5} *20*; α(L)=1.075×10^{-6} *15*; α(M)=8.17×10^{-8} *11* α(IPF)=9.34×10^{-5} *13*
		1582.6	32 *10*	4191.01	$5/2^+$	[M1,E2]		0.000119 *18*	α(K)=1.22×10^{-5} *10*; α(L)=9.1×10^{-7} *8*; α(M)=6.9×10^{-8} *6* α(IPF)=0.000105 *16* I_γ: weighted average of 30 *10* from (α,pγ) and 34 *12* from (p,γ).

$^{31}_{15}P_{16}$-38

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									If M1, B(M1)(W.u.)=0.027 *+21−11*. If E2, B(E2)(W.u.)=48 *+37−19*.
5772.7	7/2$^+$	2267.3[c]	<14.3	3506.1	3/2$^+$	[E2]		0.000453 *6*	B(E2)(W.u.)<8.6 α(K)=6.74×10^{-6} *9*; α(L)=5.01×10^{-7} *7*; α(M)=3.81×10^{-8} *5* α(IPF)=0.000445 *6*
		2358.0 *10*	100 *20*	3414.58	7/2$^+$	[M1,E2]		0.00045 *5*	α(K)=6.06×10^{-6} *26*; α(L)=4.51×10^{-7} *19*; α(M)=3.42×10^{-8} *15* α(IPF)=0.00044 *5* E_γ: from (^{12}C,αpγ). I_γ: from (α,pγ). Others: 100 *38* from (α,γ):resonances and 100 *26* from (p,γ). If M1, B(M1)(W.u.)=0.026 *+17−8*. If E2, B(E2)(W.u.)=20 *+14−7*.
		2639.1[c]	<29	3134.3	1/2$^+$	[M3]		0.0002413 *34*	α(K)=1.051×10^{-5} *15*; α(L)=7.83×10^{-7} *11*; α(M)=5.95×10^{-8} *8* α(IPF)=0.0002299 *32* B(M3)(W.u.)<7611579 upper limit exceeds RUL=10.
		3539.5	43 *12*	2233.63	5/2$^+$	[M1,E2]		0.00094 *7*	α(K)=3.23×10^{-6} *8*; α(L)=2.40×10^{-7} *6*; α(M)=1.83×10^{-8} *4* α(IPF)=0.00094 *7* I_γ: from (p,γ). Others: 38 *13* from (α,γ):resonances and 50 *16* from (α,pγ). If M1, B(M1)(W.u.)=0.0033 *+24−12*. If E2, B(E2)(W.u.)=1.2 *+9−4*.
		4507.0	55 *14*	1266.08	3/2$^+$	[E2]		1.35×10^{-3} *2*	B(E2)(W.u.)=0.44 *+33−15* α(K)=2.323×10^{-6} *33*; α(L)=1.726×10^{-7} *24*; α(M)=1.312×10^{-8} *18* α(IPF)=0.001343 *19* I_γ: weighted average of 50 *25* from (α,γ):resonances and 57 *14* from (p,γ).
		5772.9[c]	<14.3	0.0	1/2$^+$	[M3]		1.05×10^{-3} *2*	α(K)=2.465×10^{-6} *35*; α(L)=1.833×10^{-7} *26*; α(M)=1.393×10^{-8} *20* α(IPF)=0.001046 *15* B(M3)(W.u.)<16743 upper limit exceeds RUL=10.
5892.1	9/2$^+$	2477.3[a] *6*	10.1 *22*	3414.58	7/2$^+$	M1+E2[@]	+0.23 *6*	0.000457 *7*	B(M1)(W.u.)=0.0047 *+25−15*; B(E2)(W.u.)=0.18 *+15−9* α(K)=5.41×10^{-6} *8*; α(L)=4.02×10^{-7} *6*; α(M)=3.06×10^{-8} *4* α(IPF)=0.000451 *7* I_γ: weighted average of 9.6 *29* from (^{16}O,2αpγ), 11.1 *22* from (α,pγ), and 8.7 *33* from (p,γ).
		2596.8[c]	<3.3	3294.90	5/2$^+$	[E2]		0.000609 *9*	B(E2)(W.u.)<1.6 α(K)=5.36×10^{-6} *8*; α(L)=3.98×10^{-7} *6*; α(M)=3.03×10^{-8} *4* α(IPF)=0.000603 *8*

$^{31}_{15}P_{16}$-39

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π	Mult.#	δ#	α†	Comments
5892.1	9/2$^+$	2757.5[c]	<10.9	3134.3	1/2$^+$	[E4]			B(E4)(W.u.)<4.4×10^9 upper limit exceeds RUL=100.
		3658.2[a] *5*	100.0 *22*	2233.63	5/2$^+$	E2@		1.05×10^{-3} *2*	B(E2)(W.u.)=5.1 *+25−13* α(K)=3.14×10^{-6} *4*; α(L)=2.332×10^{-7} *33*; α(M)=1.772×10^{-8} *25* α(IPF)=0.001052 *15* I_γ: from (α,pγ). Others: 100 *8* from (^{16}O,2αpγ) and 100.0 *33* from (p,γ). Mult.: Q, ΔJ=2 also from γγ(ADO) in (^{16}O,2αpγ).
		4625.4[c]	<5.4	1266.08	3/2$^+$	[M3]		0.000783 *11*	α(K)=3.59×10^{-6} *5*; α(L)=2.67×10^{-7} *4*; α(M)=2.029×10^{-8} *28* α(IPF)=0.000779 *11* B(M3)(W.u.)<45854 upper limit exceeds RUL=10.
		5891.3[c]	<5.4	0.0	1/2$^+$	[E4]			B(E4)(W.u.)<2436369 upper limit exceeds RUL=100.
5987.9	(3/2)$^+$	871.9[c]	<5.4	5115.2	5/2$^+$				
		2692.8	7.5 *22*	3294.90	5/2$^+$				
		2853.5[c]	<3.2	3134.3	1/2$^+$				
		5987.3	100.0 *22*	0.0	1/2$^+$				
6046.4	7/2$^+$	x							20% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 181.
		1412.2	36 *13*	4633.58	7/2$^+$	[M1+E2]		6.6×10^{-5} *10*	B(M1)(W.u.)=0.051 *+51−24* α(K)=1.51×10^{-5} *15*; α(L)=1.13×10^{-6} *12*; α(M)=8.6×10^{-8} *9* α(IPF)=5.0×10^{-5} *9* I_γ: weighted average of 53 *12* from (α,pγ) and 27 *9* from (p,γ). B(E2)(W.u.)=1.1×10^2 *+11−5* exceeds RUL=100 if pure E2.
		1615.2[c]	12 *6*	4430.84	7/2$^-$	[E1]		0.000365 *5*	B(E1)(W.u.)=0.00035 *+40−19* α(K)=7.01×10^{-6} *10*; α(L)=5.21×10^{-7} *7*; α(M)=3.96×10^{-8} *6* α(IPF)=0.000358 *5*
		1785.9[c]	6.1 *30*	4260.4	3/2$^+$	[E2]		0.0002229 *31*	B(E2)(W.u.)=6 *+7−3* α(K)=1.040×10^{-5} *15*; α(L)=7.74×10^{-7} *11*; α(M)=5.88×10^{-8} *8* α(IPF)=0.0002117 *30*
		2631.7	100 *8*	3414.58	7/2$^+$	(M1(+E2))	−0.4 *6*	0.00053 *4*	B(M1)(W.u.)=0.019 *+42−13*; B(E2)(W.u.)<20 α(K)=4.95×10^{-6} *14*; α(L)=3.68×10^{-7} *10*; α(M)=2.80×10^{-8} *8*

$^{31}_{15}P_{16}$-40

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(IPF)=0.00053 *4* I_γ: from (α,pγ). Other: 100 *15* from (p,γ). Mult.: D+Q from p$\gamma(\theta)$ in (α,pγ); M1+E2 from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
6046.4	7/2$^+$	2751.3	55 *15*	3294.90	5/2$^+$	[M1,E2]		0.00062 *6*	α(K)=4.73×10^{-6} *16*; α(L)=3.52×10^{-7} *12*; α(M)=2.67×10^{-8} *9* α(IPF)=0.00062 *6* If M1, B(M1)(W.u.)=0.011 *+10−4*. If E2, B(E2)(W.u.)=6 *+6−3*.
		3812.3	43 *8*	2233.63	5/2$^+$	M1+E2[@]	+1.2 *6*	0.00105 *5*	B(M1)(W.u.)=0.0013 *+18−7*; B(E2)(W.u.)=0.6 *+5−4* α(K)=2.91×10^{-6} *5*; α(L)=2.16×10^{-7} *4*; α(M)=1.644×10^{-8} *30* α(IPF)=0.00105 *5* I_γ: from (α,pγ). Other: 42 *12* from (p,γ).
6078.53	9/2$^+$	1444.4 *9*	30 *10*	4633.58	7/2$^+$	M1+E2	+0.13 *8*	6.34×10^{-5} *11*	B(M1)(W.u.)=0.06 *+6−3*; B(E2)(W.u.)=2.2 *+47−19* α(K)=1.313×10^{-5} *20*; α(L)=9.77×10^{-7} *15*; α(M)=7.43×10^{-8} *11* α(IPF)=4.92×10^{-5} *9* E_γ: unweighted average of 1445.0 *3* from (^{20}Ne,pγ), 1445.6 *4* from (^{16}O,2αpγ), 1442.7 *8* from (^{12}C,αpγ). Others: 1444.6 from (p,γ). I_γ: unweighted average of 42 *4* from (^{20}Ne,pγ), 50 *8* from (^{16}O,2αpγ), 13.6 *34* from (α,pγ) and 13 *4* from (p,γ). Note that while values from (α,pγ) and (p,γ) are consistent, and so are those from the other two studies, the two pairs of values are discrepant. The evaluators consider it is likely because the 3845γ from 6078 level is unresolved with the 3850γ from the 5116 level due to poor resolution in (p,γ) and (α,pγ), and the 5116 level is however not populated in the more recent studies of (^{20}Ne,pγ) and (^{16}O,2αpγ). Mult.,δ: D+Q and δ from $\gamma\gamma$(ADO) in (^{16}O,2αpγ); E1+M2 ruled out by RUL.
		2664.1[c]	11 *5*	3414.58	7/2$^+$	[M1,E2]		0.00058 *6*	α(K)=4.98×10^{-6} *17*; α(L)=3.70×10^{-7} *13*; α(M)=2.81×10^{-8} *10* α(IPF)=0.00058 *6* If M1, B(M1)(W.u.)=0.0036 *+37−18*. If E2, B(E2)(W.u.)=2.3 *+23−11*.
		2783.7[c]	9 *5*	3294.90	5/2$^+$	[E2]		0.000693 *10*	B(E2)(W.u.)=1.5 *+17−8* α(K)=4.78×10^{-6} *7*; α(L)=3.56×10^{-7} *5*; α(M)=2.70×10^{-8} *4* α(IPF)=0.000688 *10*

$^{31}_{15}P_{16}$-41

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
6078.53	$9/2^+$	3844.6 *2*	100.0 *34*	2233.63	$5/2^+$	E2[@]		1.12×10^{-3} *2*	B(E2)(W.u.)=3.3 *+31−12* α(K)=2.92×10^{-6} *4*; α(L)=2.167×10^{-7} *30*; α(M)=1.647×10^{-8} *23* α(IPF)=0.001115 *16* E_γ: weighted average of 3844.6 *1* from (^{20}Ne,pγ), 3846 *4* from (^{12}C,αpγ), and 3846.3 *7* from (^{16}O,2αpγ). I_γ: from (α,pγ). Others: 100 *9* from (^{20}Ne,pγ), 100 *8* from (^{16}O,2αpγ), and 100 *13* from (p,γ).
		4812.3[c]	<10.7	1266.08	$3/2^+$	[M3]		0.000830 *12*	α(K)=3.35×10^{-6} *5*; α(L)=2.491×10^{-7} *35*; α(M)=1.894×10^{-8} *27* α(IPF)=0.000826 *12* B(M3)(W.u.)<89156 upper limit exceeds RUL=10.
		6078.2[c]	<13.3	0.0	$1/2^+$	[E4]			B(E4)(W.u.)<5757028 upper limit exceeds RUL=100.
6233.4	$(7/2)^+$	x							25% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 182.
		2818.7	100 *13*	3414.58	$7/2^+$				
		3098.9[c]	<12.5	3134.3	$1/2^+$	[M3]		0.000368 *5*	α(K)=7.58×10^{-6} *11*; α(L)=5.64×10^{-7} *8*; α(M)=4.29×10^{-8} *6* α(IPF)=0.000359 *5*
		3999.3	75 *25*	2233.63	$5/2^+$				
		6232.7	13 *8*	0.0	$1/2^+$	[M3]			
6336.6	$1/2^+$	6335.9	100	0.0	$1/2^+$				
6380.8	$(3/2)^+$	x							12% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 183.
		2966.0[c]	<3.7	3414.58	$7/2^+$				
		3085.6	22 *4*	3294.90	$5/2^+$				
		4146.7	100 *9*	2233.63	$5/2^+$				
		5114.2	20 *8*	1266.08	$3/2^+$				
		6380.1	20 *4*	0.0	$1/2^+$				
6399.0	$7/2^{(-)}$	726.6	5.7 *19*	5672.4	5/2				
		1283.0	6.3 *19*	5115.2	$5/2^+$	[E1]		0.0001244 *17*	B(E1)(W.u.)=0.00058 *+49−23* α(K)=1.022×10^{-5} *14*; α(L)=7.61×10^{-7} *11*; α(M)=5.78×10^{-8} *8* α(IPF)=0.0001134 *16*
		1967.7	100 *4*	4430.84	$7/2^-$	(M1(+E2))	+0.15 *14*	0.000242 *5*	B(M1)(W.u.)=0.08 *+6−3*; B(E2)(W.u.)=2.1 *+66−18* α(K)=7.79×10^{-6} *12*; α(L)=5.79×10^{-7} *9*; α(M)=4.40×10^{-8} *7*

$^{31}_{15}P_{16}$-42

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(IPF)=0.000234 *5* Mult.,δ: D(+Q) and δ from (p,γ); probable Q component favors E2 by RUL. Other: −0.03 *8* from (α,pγ).
6399.0	7/2$^{(-)}$	2208.0[c]	<5.1	4191.01	5/2$^+$	[E1]		0.000789 *11*	B(E1)(W.u.)<1.8×10^{-4} α(K)=4.42×10^{-6} *6*; α(L)=3.29×10^{-7} *5*; α(M)=2.497×10^{-8} *35* α(IPF)=0.000785 *11*
		2984.2	2.5 *6*	3414.58	7/2$^+$	[E1]		1.24×10^{-3} *2*	B(E1)(W.u.)=1.8×10^{-5} *+15−7* α(K)=2.96×10^{-6} *4*; α(L)=2.197×10^{-7} *31*; α(M)=1.670×10^{-8} *23* α(IPF)=0.001233 *17*
		3103.8	8.2 *25*	3294.90	5/2$^+$	[E1]		1.30×10^{-3} *2*	B(E1)(W.u.)=5.3×10^{-5} *+44−21* α(K)=2.81×10^{-6} *4*; α(L)=2.090×10^{-7} *29*; α(M)=1.588×10^{-8} *22* α(IPF)=0.001294 *18*
		3264.5[c]	<2.5	3134.3	1/2$^+$	[E3]		0.000644 *9*	α(K)=5.13×10^{-6} *7*; α(L)=3.81×10^{-7} *5*; α(M)=2.90×10^{-8} *4* α(IPF)=0.000638 *9* B(E3)(W.u.)<7693 upper limit exceeds RUL=100.
		4164.9	3.8 *13*	2233.63	5/2$^+$	[E1]		1.74×10^{-3} *2*	B(E1)(W.u.)=1.0×10^{-5} *+9−4* α(K)=1.959×10^{-6} *27*; α(L)=1.456×10^{-7} *20*; α(M)=1.106×10^{-8} *15* α(IPF)=0.001741 *24*
		6398.3[c]	<2.5	0.0	1/2$^+$	[E3]			B(E3)(W.u.)<69
6453.49	11/2$^+$	1110.2 *3*	13.0 *15*	5342.84	9/2$^+$	M1+E2[@]	+0.27 *3*	2.41×10^{-5} *4*	B(M1)(W.u.)=0.07 *+6−3*; B(E2)(W.u.)=19 *+18−7* α(K)=2.149×10^{-5} *32*; α(L)=1.601×10^{-6} *24*; α(M)=1.216×10^{-7} *18* α(IPF)=9.11×10^{-7} *17* E_γ: weighted average of 1110.1 *3* from (^{20}Ne,pγ), 1109.5 *5* from (^{12}C,αpγ), and 1110.5 *3* from (^{16}O,2αpγ). I_γ: unweighted average of 9.9 *9* from (^{20}Ne,pγ), 13.1 *28* from (^{12}C,αpγ), 16.9 *18* from (^{16}O,2αpγ), and 12 *5* from (α,pγ).
		1819.6[a] *6*	2.71[a] *27*	4633.58	7/2$^+$	[E2]		0.0002382 *33*	B(E2)(W.u.)=4.8 *+43−17* α(K)=1.004×10^{-5} *14*; α(L)=7.47×10^{-7} *10*; α(M)=5.68×10^{-8} *8* α(IPF)=0.0002273 *32*

$^{31}_{15}P_{16}$-43

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
6453.49	$11/2^+$	3039.3 *4*	100.0 *31*	3414.58	$7/2^+$	E2[@]		0.000806 *11*	B(E2)(W.u.)=14 *+12−5* α(K)=4.16×10^{-6} *6*; α(L)=3.09×10^{-7} *4*; α(M)=2.351×10^{-8} *33* α(IPF)=0.000802 *11* E_γ: weighted average of 3039.7 *4* from (^{20}Ne,pγ), 3038.9 *19* from (^{12}C,αpγ), and 3038.7 *5* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Others: 100 *5* from (^{20}Ne,pγ), 100 *29* from (^{12}C,αpγ), 100 *5* from (α,pγ), and 100 *12* from (p,γ).
		3320.2[c]	<2.4	3134.3	$1/2^+$	[M5]			
		4220.6[c]	<1.2	2233.63	$5/2^+$	[M3]		0.000679 *10*	α(K)=4.22×10^{-6} *6*; α(L)=3.14×10^{-7} *4*; α(M)=2.388×10^{-8} *33* α(IPF)=0.000674 *9* I_γ: other: 11 *11* (α,γ):res. B(M3)(W.u.)<27931 upper limit exceeds RUL=10.
		5188.1[c]	<2.4	1266.08	$3/2^+$	[E4]			B(E4)(W.u.)<4855888 upper limit exceeds RUL=100.
		6454.0[c]	<1.2	0.0	$1/2^+$	[M5]			
6460.8	$5/2^+$	x							10% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 184.
		3326.3	100 *7*	3134.3	$1/2^+$				
		6460.1[c]	29 *14*	0.0	$1/2^+$				
6497.1	$3/2^-$	3200.9[c]	<6.6	3294.90	$5/2^+$				
		3361.6[c]	<6.6	3134.3	$1/2^+$				
		5229.5	32 *7*	1266.08	$3/2^+$				
		6495.4	100 *7*	0.0	$1/2^+$				
6501.3	$9/2^-$	x							20% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 185.
		2070.6 *5*	100 *6*	4430.84	$7/2^-$	M1+E2[@]	+1.3 *3*	0.000330 *11*	B(M1)(W.u.)=0.021 *+16−7*; B(E2)(W.u.)=36 *+20−12* α(K)=7.63×10^{-6} *14*; α(L)=5.68×10^{-7} *11*; α(M)=4.31×10^{-8} *8* α(IPF)=0.000321 *11* E_γ: unweighted average of 2071.5 *2* from (^{20}Ne,pγ), 2069.9 *7* from (^{12}C,αpγ), and 2070.4 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Others: 100 *40* from (α,γ):resonances, 100 *20* from (α,pγ), and 100 *13* from (p,γ).
		3086.4 *6*	18.3 *14*	3414.58	$7/2^+$	[E1]		1.29×10^{-3} *2*	B(E1)(W.u.)=1.0×10^{-4} *+6−3* α(K)=2.83×10^{-6} *4*; α(L)=2.105×10^{-7} *29*; α(M)=1.600×10^{-8} *22* α(IPF)=0.001285 *18* E_γ,I_γ: from (^{16}O,2αpγ). Other: Iγ=100 *40* from (α,γ):resonances and 100 *20* from (α,pγ) are discrepant.

$^{31}_{15}P_{16}$-44

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
6595.5	(5/2)$^-$	x							30% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 186.
		2163.0	32 *10*	4430.84	7/2$^-$				
		2333.8[c]	8 *4*	4260.4	3/2$^+$				
		3088.0[c]	<6.0	3506.1	3/2$^+$				
		3299.1[c]	<10.0	3294.90	5/2$^+$				
		5327.7	100 *10*	1266.08	3/2$^+$				
		6593.5[c]	<10.0	0.0	1/2$^+$				
6610.4	3/2$^-$	x							13% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 187.
		1595	100 *8*	5015.2	3/2$^-$				
		1976.1[c]	<7.7	4633.58	7/2$^+$				
		2179.1[c]	<5.1	4430.84	7/2$^-$				
		2419.4	15 *5*	4191.01	5/2$^+$				
		3104.1[c]	<7.7	3506.1	3/2$^+$				
		3195.6[c]	<7.7	3414.58	7/2$^+$				
		4376.3[c]	<7.7	2233.63	5/2$^+$				
		5343.8	69 *10*	1266.08	3/2$^+$				
		6609.6	39 *8*	0.0	1/2$^+$				
6796.0	9/2$^-$	2364.8 *6*	100 *7*	4430.84	7/2$^-$	M1+E2[@]	+0.29 *4*	0.000411 *6*	B(M1)(W.u.)=0.0081 *+34−19*; B(E2)(W.u.)=0.54 *+30−17* α(K)=5.83×10^{-6} *8*; α(L)=4.33×10^{-7} *6*; α(M)=3.29×10^{-8} *5* α(IPF)=0.000405 *6* E_γ: weighted average of 2363.3 *10* from (^{12}C,αpγ) and 2365.0 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Others: 100 *11* from (α,pγ), 100 *16* from (^{12}C,αpγ). Mult.,δ: from (α,pγ). ΔJ=1 from γγ(DCO) in (^{16}O,2αpγ).
		3380.8 *6*	37 *7*	3414.58	7/2$^+$	(E1)		1.42×10^{-3} *2*	B(E1)(W.u.)=3.5×10^{-5} *+16−9* α(K)=2.526×10^{-6} *35*; α(L)=1.877×10^{-7} *26*; α(M)=1.426×10^{-8} *20* α(IPF)=0.001421 *20* E_γ: weighted average of 3381.6 *16* from (^{12}C,αpγ) and 3380.7 *6* from (^{16}O,2αpγ). I_γ: weighted average of 38 *7* from (^{16}O,2αpγ), and 33 *11* from (α,pγ). Other: 114 *32* from (^{12}C,αpγ) is discrepant. Mult.: D+Q from pγ(θ) in (α,pγ); E1+M2 from Δπ, where

$^{31}_{15}P_{16}$-45

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									parity assignments of connecting levels are uniquely established from independent arguments; M2 component unlikely from RUL.
6823.91	11/2$^-$	1480.8[&] *2*	66 *3*	5342.84	9/2$^+$	E1[@]		0.000260 *4*	B(E1)(W.u.)=0.0013 *+9−4* α(K)=8.05×10^{-6} *11*; α(L)=5.98×10^{-7} *8*; α(M)=4.55×10^{-8} *6* α(IPF)=0.0002515 *35* E_γ: others: 1480.5 *5* from (^{12}C,αpγ) and 1480.8 *3* from (^{16}O,2αpγ). I_γ: weighted average of 65.9 *26* from (^{16}O,2αpγ), 67 *17* from (α,pγ), and 54 *15* from (p,γ). Other: 114 *4* from (^{20}Ne,pγ) is discrepant.
		2393.8 *3*	100 *3*	4430.84	7/2$^-$	E2		0.000513 *7*	B(E2)(W.u.)=12 *+8−4* α(K)=6.14×10^{-6} *9*; α(L)=4.57×10^{-7} *6*; α(M)=3.47×10^{-8} *5* α(IPF)=0.000507 *7* E_γ: weighted average of 2394.0 *2* from (^{20}Ne,pγ), 2393.6 *7* from (^{12}C,αpγ), and 2393.0 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Others: 100 *7* from (^{20}Ne,pγ), 100 *17* from (α,pγ), and 100 *23* from (p,γ). Mult.: Q with ΔJ=2 from γγ(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); M2 ruled out by RUL.
		3529.0[c]	<12.3	3294.90	5/2$^+$	[E3]		0.000737 *10*	α(K)=4.47×10^{-6} *6*; α(L)=3.33×10^{-7} *5*; α(M)=2.528×10^{-8} *35* α(IPF)=0.000732 *10* B(E3)(W.u.)<6197 upper limit exceeds RUL=100.
6828	(7/2$^-$,9/2$^+$)	2397[b]	100[b] *25*	4430.84	7/2$^-$				
		3414[b]	25[b] *17*	3414.58	7/2$^+$				
		4595[b]	42[b] *17*	2233.63	5/2$^+$				
6841.9	(5/2)$^-$	2650.9[c]	<16.7	4191.01	5/2$^+$				
		3546.7	67 *17*	3294.90	5/2$^+$				
		4607.7	100 *17*	2233.63	5/2$^+$				
6909.6	(3/2)$^-$	4675.4	25 *6*	2233.63	5/2$^+$				
		5642.9[c]	<12.5	1266.08	3/2$^+$				
		6908.8	100 *6*	0.0	1/2$^+$				E_γ: other: 6909 *4* from (γ,γ′).
6931.4	5/2$^+$	2297.1[c]	<5.8	4633.58	7/2$^+$				I_γ: other: 32 *16* from (α,γ):resonances is inconsistent.
		2500.1	18 *5*	4430.84	7/2$^-$	[E1]		0.000970 *14*	B(E1)(W.u.)>1.5×10^{-4} α(K)=3.73×10^{-6} *5*; α(L)=2.77×10^{-7} *4*; α(M)=2.106×10^{-8} *29* α(IPF)=0.000966 *14* I_γ: weighted average of 27 *10* from (α,γ):resonances and 16 *5* from (p,γ).

$^{31}_{15}P_{16}$-46

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
6931.4	5/2$^+$	4697.2	100 *5*	2233.63	5/2$^+$	M1+E2[@]	−1.3 *3*	1.34×10^{-3} *3*	B(M1)(W.u.)>0.0015; B(E2)(W.u.)>0.54 α(K)=2.172×10^{-6} *31*; α(L)=1.614×10^{-7} *23*; α(M)=1.227×10^{-8} *18* α(IPF)=0.001342 *27* I_γ: other: 100 *19* from (α,γ):resonances. Mult.,δ: from (α,pγ).
		6930.6[c]	<11.6	0.0	1/2$^+$	[E2]			B(E2)(W.u.)>9.5×10^{-7}
7079.9	(3/2)$^-$	2648.6	100 *30*	4430.84	7/2$^-$				
		7079.0[c]	100 *30*	0.0	1/2$^+$				
7084.0	(3/2$^+$,5/2$^+$)	3577.7	12 *5*	3506.1	3/2$^+$				
		3669.2	100 *12*	3414.58	7/2$^+$				
		3788.8	47 *12*	3294.90	5/2$^+$				
		3949.4[c]	<9.3	3134.3	1/2$^+$				
		4849.8	49 *12*	2233.63	5/2$^+$				
		5817.3	26 *7*	1266.08	3/2$^+$				
		7083.1[c]	<7.0	0.0	1/2$^+$				
7117.7	9/2$^+$	x							40% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 188.
		3703.1	100	3414.58	7/2$^+$	M1+E2[@]	−0.18 *2*	0.000932 *13*	B(M1)(W.u.)≥0.025; B(E2)(W.u.)≥0.21 α(K)=2.97×10^{-6} *4*; α(L)=2.209×10^{-7} *31*; α(M)=1.679×10^{-8} *24* α(IPF)=0.000929 *13*
7141.1	1/2$^+$	5874.4	19 *6*	1266.08	3/2$^+$				I_γ: from (γ,γ′). Other: 19 from (p,γ).
		7140.2	100 *4*	0.0	1/2$^+$				E_γ: other: 7140 *4* from (γ,γ′). I_γ: from (γ,γ′).
7214.3	1/2$^-$,3/2$^-$	x							30% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 189.
		5947.6[c]	<7.1	1266.08	3/2$^+$				
		7213.4	100 *14*	0.0	1/2$^+$				E_γ: other: 7214 *4* from (γ,γ′).
7313.7	(1/2,3/2)$^+$	7312.8	100	0.0	1/2$^+$				E_γ: other: 7316 *4* from (γ,γ′).
7442.1	11/2$^+$	988.1 *6*	22 *8*	6453.49	11/2$^+$	(M1(+E2))	+0.3 *3*		E_γ: unweighted average of 988.9 *3* from (^{20}Ne,pγ), 987.0 *4* from (^{12}C,αpγ), and 988.4 *2* from (^{16}O,2αpγ). This γ is not seen in (α,γ):resonances due to the high detector threshold (>2 MeV). I_γ: unweighted average of 36 *4* from (^{20}Ne,pγ), 18.9

$^{31}_{15}P_{16}$-47

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[†]	Comments
								19 from (^{16}O,2αpγ), and 9.9 *22* from (α,pγ). Mult.,δ: D(+Q) and δ from pγ(θ) in (α,pγ); ΔJ=0 from γγ(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); M1+E2 from level scheme. B(M1)(W.u.)=0.092 to 2.7. B(E2)(W.u.)<3234, upper limit exceeds RUL=100.
7442.1	11/2$^+$	2807[bc]		4633.58	7/2$^+$			E_γ,I_γ: reported in (α,γ):resonances only. I(2807γ)=50 *10* and I(4028γ)=40 *10* reported in the level scheme in 1971De34, however, it looks from the gamma spectrum in Fig.2 of 1971De24 that the 2807γ peak is much weaker than the 4028γ peak. The evaluators consider this γ questionable.
		4027.5 *4*	100.0 *22*	3414.58	7/2$^+$	E2[@]	1.18×10^{-3} *2*	B(E2)(W.u.)=6 *+7−3* α(K)=2.73×10^{-6} *4*; α(L)=2.026×10^{-7} *28*; α(M)=1.540×10^{-8} *22* α(IPF)=0.001180 *17* E_γ: weighted average of 4027.8 *3* from (^{20}Ne,pγ), 4027 *3* from (^{12}C,αpγ), and 4026.6 *5* from (^{16}O,2αpγ). I_γ: from (α,pγ). Others: 100 *8* from (^{20}Ne,pγ), 100 *4* from (^{16}O,2αpγ), and 100 *25* from (α,γ):resonances. Mult.: ΔJ=2 also supported by γγ(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ).
		5207[bc]		2233.63	5/2$^+$	[M3]	0.000925 *13*	α(K)=2.93×10^{-6} *4*; α(L)=2.177×10^{-7} *30*; α(M)=1.655×10^{-8} *23* α(IPF)=0.000922 *13* E_γ,I_γ: reported in (α,γ):resonances only with I(5208γ)/I(4028γ)=10 *5*/40 *10*. It is identified by 1971De34 as a very broad single-escape peak with low statistics in the γ spectrum. The evaluators consider it questionable due to the poor resolution, lack of γγ-coin data, non-observation in other studies.
7466	(7/2)$^-$	966	22 *11*	6501.3	9/2$^-$			E_γ,I_γ: from (α,pγ).
		3035	100 *22*	4430.84	7/2$^-$			E_γ,I_γ: from (α,pγ).
		4051	100 *22*	3414.58	7/2$^+$			E_γ,I_γ: from (α,pγ).
7687.2?		5452.9[c]	100	2233.63	5/2$^+$			E_γ: from (p,γ).
7717.2	(5/2)$^-$	2702.3 *4*	98.4 *23*	5014.9	(3/2$^+$)			
		3285.9 *5*	100.0 *26*	4430.84	7/2$^-$			
		4422.2 *7*	61.3 *26*	3294.90	5/2$^+$			
7781.17	3/2$^-$	1185.7 *5*	1.0 *2*	6595.5	(5/2)$^-$			
		1284.0 *5*	1.0 *2*	6497.1	3/2$^-$			
		2663.5 *5*	1.0 *2*	5115.2	5/2$^+$			
		2765.7 *5*	4.78 *20*	5014.9	(3/2$^+$)			
		2996.3 *5*	5.38 *20*	4784.7	5/2$^+$			
		3519.2 *6*	1.20 *20*	4260.4	3/2$^+$			
		4488.7 *7*	1.59 *20*	3294.90	5/2$^+$			

$^{31}_{15}P_{16}$-48

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
7781.17	3/2$^-$	4649.1 *7*	20.7 *4*	3134.3	1/2$^+$	E1+M2	−0.05 *2*	1.91×10^{-3} *3*	α(K)=1.723×10^{-6} *24*; α(L)=1.280×10^{-7} *18*; α(M)=9.73×10^{-9} *14* α(IPF)=0.001904 *27*
		5548.6 *8*	9.6 *4*	2233.63	5/2$^+$				
		6515.3 *10*	53.4 *6*	1266.08	3/2$^+$				
		7780.9 *12*	100.0 *8*	0.0	1/2$^+$	E1+M2	+0.045 *5*		
7851.2	(1/2$^-$,3/2)	7850 *4*	100	0.0	1/2$^+$				E_γ: from (γ,γ′).
7859.6	11/2$^{(-)}$	1063.4 *4*	70 *5*	6796.0	9/2$^-$				E_γ: weighted average of 1063.2 *6* from (^{12}C,αpγ) and 1063.5 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ).
		2516.8[a] *6*	50[a] *5*	5342.84	9/2$^+$	(E1)		0.000980 *14*	α(K)=3.70×10^{-6} *5*; α(L)=2.75×10^{-7} *4*; α(M)=2.087×10^{-8} *29* α(IPF)=0.000976 *14* Mult.: D with ΔJ=1 from γγ(ADO) in (^{16}O,2αpγ); (M1) from level scheme.
		3428.6[a] *6*	100[a] *5*	4430.84	7/2$^-$	(E2)		0.000966 *14*	α(K)=3.46×10^{-6} *5*; α(L)=2.57×10^{-7} *4*; α(M)=1.953×10^{-8} *27* α(IPF)=0.000962 *13* E_γ,I_γ: other: 3428.2 *17* with Iγ=100 *17* from (^{12}C,αpγ). Mult.: Q with ΔJ=2 from γγ(ADO) in (^{16}O,2αpγ); M2 is less likely.
7897.9	1/2$^-$	2882.2 *4*	2.79 *6*	5014.9	(3/2$^+$)				
		4389.8 *6*	0.56 *5*	3506.1	3/2$^+$				
		4766.0 *7*	0.69 *6*	3134.3	1/2$^+$				
		6633.6 *10*	1.90 *14*	1266.08	3/2$^+$				
		7898.1 *12*	100.00 *21*	0.0	1/2$^+$				E_γ: other: 7896 *6* from (γ,γ′).
7944.6	3/2$^+$,5/2$^+$	3161.0	44	4784.7	5/2$^+$				
		3351.9	6.8	4592.5	3/2$^+$				
		3753.5	100	4191.01	5/2$^+$				
		4438.2	56	3506.1	3/2$^+$				
		4649.2	17.2	3294.90	5/2$^+$				
		4809.9	16.0	3134.3	1/2$^+$				
		6677.7	80	1266.08	3/2$^+$				
		7943.5	80	0.0	1/2$^+$				
8031.2	5/2$^+$	2501.1	8.3	5530.0	(5/2)$^+$				
		3016	4.2	5014.9	(3/2$^+$)				
		3247.6	20.8	4784.7	5/2$^+$				
		3396.8	13.3	4633.58	7/2$^+$				
		3438.5	13.8	4592.5	3/2$^+$				

$^{31}_{15}P_{16}$-49

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8031.2	5/2$^+$	3599.8	8.3	4430.84	7/2$^-$				
		3770.6	10.0	4260.4	3/2$^+$				
		3840.0	100	4191.01	5/2$^+$	(M1)		0.000977 *14*	α(K)=2.82×10^{-6} *4*; α(L)=2.096×10^{-7} *29*; α(M)=1.593×10^{-8} *22* α(IPF)=0.000974 *14*
		4524.7	88	3506.1	3/2$^+$	(M1+E2)	+0.033	1.20×10^{-3} *2*	α(K)=2.247×10^{-6} *31*; α(L)=1.670×10^{-7} *23*; α(M)=1.269×10^{-8} *18* α(IPF)=0.001197 *17*
		4616.2	34	3414.58	7/2$^+$				
		4735.8	14.6	3294.90	5/2$^+$				
		5796.8	16.7	2233.63	5/2$^+$				
		6764.3	75	1266.08	3/2$^+$				
		8030.1	10.4	0.0	1/2$^+$				
8047.7	3/2$^-$	833.4	0.74	7214.3	1/2$^-$,3/2$^-$				
		1138.1	1.18	6909.6	(3/2)$^-$				
		2375.2	2.35	5672.4	5/2				
		2488.7	0.29	5558.9	3/2$^+$				
		3032	5.6	5015.2	3/2$^-$				
		3455.0	3.1	4592.5	3/2$^+$				
		3856.5	7.4	4191.01	5/2$^+$				
		4541.2	14.7	3506.1	3/2$^+$				
		4752.3	2.7	3294.90	5/2$^+$				
		4913.0	4.4	3134.3	1/2$^+$				
		5813.3	3.2	2233.63	5/2$^+$				
		6780.8	1.47	1266.08	3/2$^+$				
		8046.6	100	0.0	1/2$^+$	(E1)			
8076.91	11/2$^{(-)}$	1253.4[a] *3*	100[a] *9*	6823.91	11/2$^-$	D			Mult.: D from (^{16}O,2αpγ). ΔJ=0 from γγ(ADO).
		2733.6[a] *6*	50[a] *9*	5342.84	9/2$^+$				
		3645.6[a] *7*	41[a] *9*	4430.84	7/2$^-$	Q			Mult.: from (^{16}O,2αpγ). ΔJ=2 from γγ(ADO).
8103.6	5/2$^+$	1870.1	9.3	6233.4	(7/2)$^+$				
		2211.6	1.19	5892.1	9/2$^+$				
		2330.0	3.4	5772.7	7/2$^+$				
		2431.1	0.75	5672.4	5/2				
		2544.6	0.75	5558.9	3/2$^+$				
		3088	0.90	5015.2	3/2$^-$				
		3320.0	0.60	4784.7	5/2$^+$				
		3842.9	3.7	4260.4	3/2$^+$				
		3912.4	14.3	4191.01	5/2$^+$	(M1+E2)	+0.06 *1*	1.00×10^{-3} *1*	α(K)=2.75×10^{-6} *4*; α(L)=2.042×10^{-7} *29*; α(M)=1.552×10^{-8} *22* α(IPF)=0.001000 *14*
		4597.1	3.0	3506.1	3/2$^+$				

$^{31}_{15}P_{16}$-50

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8103.6	5/2$^+$	4808.2	7.8	3294.90	5/2$^+$				
		4968.9	0.90	3134.3	1/2$^+$				
		5869.2	1.49	2233.63	5/2$^+$				
		6836.7	100	1266.08	3/2$^+$				
		8102.5	1.19	0.0	1/2$^+$				
8207.9	3/2$^+$	1827.0	0.61	6380.8	(3/2)$^+$				
		2950.9	1.21	5256.8	1/2$^+$				
		3193	0.152	5014.9	(3/2$^+$)				
		3424.3	1.21	4784.7	5/2$^+$				
		3615.2	0.30	4592.5	3/2$^+$				
		3947.2	0.61	4260.4	3/2$^+$				
		4016.7	0.76	4191.01	5/2$^+$				
		4701.4	1.82	3506.1	3/2$^+$				
		4912.5	2.12	3294.90	5/2$^+$				
		5073.2	0.30	3134.3	1/2$^+$				
		5973.5	10.6	2233.63	5/2$^+$	(M1+E2)	+0.028 *18*	1.58×10^{-3} *2*	α(K)=1.555×10^{-6} *22*; α(L)=1.156×10^{-7} *16*; α(M)=8.78×10^{-9} *12* α(IPF)=0.001577 *22*
		6940.9	39 *9*	1266.08	3/2$^+$				
		8206.7	100 *9*	0.0	1/2$^+$				E_γ: other: 8209 *4* from (γ,γ′).
8224.4	7/2$^{(-)}$	1400.2	3.9	6823.91	11/2$^-$				
		1825.3	33	6399.0	7/2$^{(-)}$	(M1(+E2))	−0.11 *28*	0.000186 *7*	α(K)=8.80×10^{-6} *19*; α(L)=6.55×10^{-7} *14*; α(M)=4.98×10^{-8} *11* α(IPF)=0.000176 *7*
		2332.4	1.85	5892.1	9/2$^+$				
		2694.3	0.93	5530.0	(5/2)$^+$				
		3108.2	5.9	5115.2	5/2$^+$				
		3209	1.30	5015.2	3/2$^-$				
		3440.8	24.1	4784.7	5/2$^+$				
		3590.0	6.5	4633.58	7/2$^+$				
		3793.0	1.48	4430.84	7/2$^-$				
		4033.2	5.9	4191.01	5/2$^+$				
		4809.4	1.85	3414.58	7/2$^+$				
		4929.0	100	3294.90	5/2$^+$	(E1+M2)	−0.03 *1*	2.00×10^{-3} *3*	α(K)=1.607×10^{-6} *23*; α(L)=1.194×10^{-7} *17*; α(M)=9.08×10^{-9} *13* α(IPF)=0.001999 *28*
8242.7	5/2$^-$	1333.1	2.22	6909.6	(3/2)$^-$				
		1400.8	2.41	6841.9	(5/2)$^-$				
		1632.3	4.8	6610.4	3/2$^-$				
		2570.2	41	5672.4	5/2	D(+Q)	+0.01 *8*		
		2683.7	1.11	5558.9	3/2$^+$				

$^{31}_{15}P_{16}$-51

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8242.7	5/2⁻	3227	1.85	5015.2	3/2⁻				
		3459.1	1.67	4784.7	5/2⁺				
		3650.0	0.74	4592.5	3/2⁺				
		3811.2	100	4430.84	7/2⁻	(M1+E2)	−0.12 *1*	0.000968 *14*	α(K)=2.85×10^{-6} *4*; α(L)=2.119×10^{-7} *30*; α(M)=1.611×10^{-8} *23* α(IPF)=0.000965 *14*
		3982.0	2.41	4260.4	3/2⁺				
		4051.5	3.2	4191.01	5/2⁺				
		4736.2	1.11	3506.1	3/2⁺				
		4827.7	18.5	3414.58	7/2⁺				
		4947.3	1.48	3294.90	5/2⁺				
		6008.3	1.85	2233.63	5/2⁺				
		6975.7	1.67	1266.08	3/2⁺				
		8241.5	1.30	0.0	1/2⁺				
8247.6	(3/2)⁻	1106.5	0.43	7141.1	1/2⁺				
		1338.0	0.57	6909.6	(3/2)⁻				
		1637.2	1.86	6610.4	3/2⁻				
		1653.3	2.00	6595.5	(5/2)⁻				
		1751.4	1.14	6497.1	3/2⁻				
		2575.1	1.00	5672.4	5/2				
		2990.6	0.71	5256.8	1/2⁺				
		3232	5.1	5015.2	3/2⁻				
		4056.4	0.43	4191.01	5/2⁺				
		4741.1	0.57	3506.1	3/2⁺				
		5112.8	13.1	3134.3	1/2⁺				
		6013.2	11.4	2233.63	5/2⁺				
		6980.6	4.4	1266.08	3/2⁺				
		8246.4	100	0.0	1/2⁺				
8264?	3/2	5129		3134.3	1/2⁺				
		8263		0.0	1/2⁺	D+Q			δ: +0.03 or +1.6.
8343.5	(11/2⁺)	4928.5[a] *8*	100	3414.58	7/2⁺	(E2)		1.47×10^{-3} *2*	B(E2)(W.u.)=1.24 *+44−26* α(K)=2.052×10^{-6} *29*; α(L)=1.525×10^{-7} *21*; α(M)=1.159×10^{-8} *16* α(IPF)=0.001469 *21* Mult.: Q with ΔJ=2 from γγ(ADO) in (^{16}O,2α,pγ); M2 is less likely.
8345.5	(7/2⁻,9/2⁺)	4154.3[b]	33[b] *25*	4191.01	5/2⁺				
		4930.5[b]	100[b] *33*	3414.58	7/2⁺				
		6111.1[b]	33[b] *17*	2233.63	5/2⁺				
8355.6	5/2⁻	1424.2	7.2	6931.4	5/2⁺				

$^{31}_{15}P_{16}$-52

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8355.6	5/2$^-$	1513.7	4.4	6841.9	(5/2)$^-$				
		1745.1	2.1	6610.4	3/2$^-$				
		1956.5	11.6	6399.0	7/2$^{(-)}$				
		1974.7	2.3	6380.8	(3/2)$^+$				
		2367.6	4.2	5987.9	(3/2)$^+$				
		2683.1	3.7	5672.4	5/2				
		2796.6	4.2	5558.9	3/2$^+$				
		3340	1.4	5015.2	3/2$^-$				
		3572.0	4.7	4784.7	5/2$^+$				
		3762.9	37	4592.5	3/2$^+$				
		3924.1	3.3	4430.84	7/2$^-$				
		4094.9	3.3	4260.4	3/2$^+$				
		4164.4	2.3	4191.01	5/2$^+$				
		4849.1	10.5	3506.1	3/2$^+$				
		4940.6	0.93	3414.58	7/2$^+$				
		5060.2	23.3	3294.90	5/2$^+$				
		6121.2	4.7	2233.63	5/2$^+$				
		7088.6	100	1266.08	3/2$^+$	(E1+M2)	+0.010 *4*		
		8354.4	1.4	0.0	1/2$^+$				
8414.2	11/2$^{(-)}$	1590.1[a] *5*	100[a] *18*	6823.91	11/2$^-$	(M1)		0.0001034 *15*	α(K)=1.109×10^{-5} *16*; α(L)=8.25×10^{-7} *12*; α(M)=6.27×10^{-8} *9* α(IPF)=9.14×10^{-5} *13* Mult.: from (^{16}O,2αpγ) with ΔJ=0 from γγ(ADO).
		1913.1[a] *5*	64[a] *27*	6501.3	9/2$^-$				
		3983.3[a] *7*	82[a] *9*	4430.84	7/2$^-$	(E2)		1.17×10^{-3} *2*	α(K)=2.77×10^{-6} *4*; α(L)=2.058×10^{-7} *29*; α(M)=1.564×10^{-8} *22* α(IPF)=0.001164 *16* Mult.: from (^{16}O,2αpγ), with ΔJ=2 from γγ(ADO).
8433.9	7/2$^-$	1839.5	11.9	6595.5	(5/2)$^-$				
		2034.8	23.8	6399.0	7/2$^{(-)}$				
		2541.9	2.6	5892.1	9/2$^+$				
		3799.4	10.5	4633.58	7/2$^+$				
		4002.4	4.1	4430.84	7/2$^-$				
		4242.7	10.2	4191.01	5/2$^+$	(E1+M2)	+0.11 *3*	1.76×10^{-3} *3*	α(K)=1.932×10^{-6} *29*; α(L)=1.435×10^{-7} *21*; α(M)=1.091×10^{-8} *16* α(IPF)=0.001760 *26*
		5018.9	5.0	3414.58	7/2$^+$				
		5138.4	69	3294.90	5/2$^+$	(E1+M2)	+0.021 *3*	2.06×10^{-3} *3*	α(K)=1.531×10^{-6} *21*; α(L)=1.138×10^{-7} *16*; α(M)=8.65×10^{-9} *12* α(IPF)=0.002059 *29*

$^{31}_{15}P_{16}$-53

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8433.9	7/2$^-$	6199.4	100	2233.63	5/2$^+$	(E1+M2)	+0.03 *2*		
		8432.7	0.95	0.0	1/2$^+$	[E3]			
8461.0	5/2$^+$	3344.8	1.8	5115.2	5/2$^+$				
		3826.5	12.5	4633.58	7/2$^+$				
		3868.2	3.2	4592.5	3/2$^+$				
		4200.3	86	4260.4	3/2$^+$	(M1(+E2))	>−0.26	0.00117 *7*	α(K)=2.53×10^{-6} *5*; α(L)=1.88×10^{-7} *4*; α(M)=1.429×10^{-8} *29* α(IPF)=0.00117 *7*
		4269.8	2.9	4191.01	5/2$^+$				
		4954.5	36	3506.1	3/2$^+$	(M1+E2)	+0.11 *3*	1.32×10^{-3} *2*	α(K)=1.989×10^{-6} *28*; α(L)=1.478×10^{-7} *21*; α(M)=1.123×10^{-8} *16* α(IPF)=0.001317 *18*
		5046.0	2.5	3414.58	7/2$^+$				
		5165.5	100	3294.90	5/2$^+$	(M1(+E2))	+0.01 *5*	1.38×10^{-3} *2*	α(K)=1.881×10^{-6} *26*; α(L)=1.398×10^{-7} *20*; α(M)=1.062×10^{-8} *15* α(IPF)=0.001379 *19*
		5326.2	5.0	3134.3	1/2$^+$				
		6226.5	93	2233.63	5/2$^+$	(M1+E2)	+0.100 *11*		
		7194.0	14.3	1266.08	3/2$^+$	(M1(+E2))	−0.02 *3*		
		8459.8	0.7	0.0	1/2$^+$				
8470.4	5/2	1628.5	7.1	6841.9	(5/2)$^-$				
		1876.0	30	6595.5	(5/2)$^-$				
		2797.9	17.9	5672.4	5/2				
		3455	15.7	5015.2	3/2$^-$				
		3877.6	7.1	4592.5	3/2$^+$				
		4038.9	15	4430.84	7/2$^-$				
		4209.7	6.1	4260.4	3/2$^+$				
		4279.2	12.5	4191.01	5/2$^+$				
		4963.9	75	3506.1	3/2$^+$				
		5055.4	11.4	3414.58	7/2$^+$				
		5174.9	61	3294.90	5/2$^+$				
		6235.9	3.2	2233.63	5/2$^+$				
		7203.4	100	1266.08	3/2$^+$	D+Q	−0.06 *3*		
		8469.2	2.5	0.0	1/2$^+$				
8543.6	1/2$^-$	3528	62	5015.2	3/2$^-$				
		3950.8	4.4	4592.5	3/2$^+$				
		4282.9	5.2	4260.4	3/2$^+$				
		5408.8	100	3134.3	1/2$^+$	(E1)		2.14×10^{-3} *3*	α(K)=1.443×10^{-6} *20*; α(L)=1.072×10^{-7} *15*; α(M)=8.15×10^{-9} *11* α(IPF)=0.002143 *30* Mult.: D+Q from (p,γ); E1 from Δπ, where parity assignments of connecting levels are uniquely established from independent arguments.

$^{31}_{15}P_{16}$-54

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8543.6	$1/2^-$	7276.6	19.2	1266.08	$3/2^+$				
		8542.3	1.9	0.0	$1/2^+$				
8552.2	$1/2^+$	2564.2	0.72	5987.9	$(3/2)^+$				
		2993.1	5.2	5558.9	$3/2^+$				
		3295.2	0.48	5256.8	$1/2^+$				
		3537	3.4	5014.9	$(3/2^+)$				
		3959.4	0.72	4592.5	$3/2^+$				
		4291.5	1.08	4260.4	$3/2^+$				
		5045.7	6.0	3506.1	$3/2^+$				
		5256.7	0.72	3294.90	$5/2^+$				
		5417.4	1.08	3134.3	$1/2^+$				
		7285.2	100	1266.08	$3/2^+$	(M1+E2)			Mult.,δ: D+Q with δ=−0.30 *2* or +4.1 *3* from (p,γ); (M1+E2) from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
		8550.9	1.08	0.0	$1/2^+$				
8555.4	$3/2^-$	1341.1	2.7	7214.3	$1/2^-,3/2^-$				
		1414.3	1.2	7141.1	$1/2^+$				
		1944.9	1.5	6610.4	$3/2^-$				
		1961.0	2.4	6595.5	$(5/2)^-$				
		2059.2	6.7	6497.1	$3/2^-$				
		2882.9	3.3	5672.4	5/2				
		2996.3	2.4	5558.9	$3/2^+$				
		3298.4	6.1	5256.8	$1/2^+$				
		3439.2	2.7	5115.2	$5/2^+$				
		3540	23	5015.2	$3/2^-$	(M1+E2)	−0.09 *8*	0.000871 *13*	α(K)=3.17×10^{-6} *4*; α(L)=2.354×10^{-7} *33*; α(M)=1.789×10^{-8} *25* α(IPF)=0.000868 *12* Mult.: D+Q from (p,γ), (M1+E2) from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
		4294.7	1.2	4260.4	$3/2^+$				
		4364.2	2.1	4191.01	$5/2^+$				
		5048.9	4.2	3506.1	$3/2^+$				
		5259.9	1.5	3294.90	$5/2^+$				
		5420.6	30	3134.3	$1/2^+$				
		6320.9	67	2233.63	$5/2^+$				
		7288.3	46	1266.08	$3/2^+$				
		8554.1	100	0.0	$1/2^+$	(E1+M2)			
8575.6	$5/2^+$	2194.7	4.2	6380.8	$(3/2)^+$				
		2587.6	2.8	5987.9	$(3/2)^+$				
		2683.6	2.22	5892.1	$9/2^+$				
		2903.1	1.67	5672.4	5/2				
		3045.4	10.6	5530.0	$(5/2)^+$				

$^{31}_{15}P_{16}$-55

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8575.6	5/2$^+$	3941.1	8.9	4633.58	7/2$^+$				
		4314.9	25.0	4260.4	3/2$^+$	(M1(+E2))	+0.28 *33*	1.14×10^{-3} *3*	α(K)=2.40×10^{-6} *4*; α(L)=1.786×10^{-7} *27*; α(M)=1.357×10^{-8} *21* α(IPF)=0.001140 *34*
		4384.4	11.7	4191.01	5/2$^+$				
		5069.1	78	3506.1	3/2$^+$	(M1+E2)	+0.18 *2*	1.35×10^{-3} *2*	α(K)=1.930×10^{-6} *27*; α(L)=1.434×10^{-7} *20*; α(M)=1.090×10^{-8} *15* α(IPF)=0.001353 *19*
		5160.5	5.0	3414.58	7/2$^+$				
		5280.1	3.9	3294.90	5/2$^+$				
		5440.8[c]		3134.3	1/2$^+$	(E2(+M3))	−0.04 *5*	1.61×10^{-3} *2*	α(K)=1.796×10^{-6} *26*; α(L)=1.335×10^{-7} *19*; α(M)=1.014×10^{-8} *15* α(IPF)=0.001611 *23*
		6341.1	23.9	2233.63	5/2$^+$	(M1+E2)	−0.09 *5*		
		7308.5	100	1266.08	3/2$^+$	(M1(+E2))	+0.01 *1*		
		8574.3	0.28	0.0	1/2$^+$				
8584.2	5/2$^{(+)}$	1973.7	31	6610.4	3/2$^-$				
		2088.0	2.19	6497.1	3/2$^-$				
		2505.3	25.0	6078.53	9/2$^+$				
		3569	12.8	5014.9	(3/2$^+$)				
		3991.4	81	4592.5	3/2$^+$				
		5077.7	41	3506.1	3/2$^+$				
		5449.4	0.94	3134.3	1/2$^+$				
		7317.1	44	1266.08	3/2$^+$	(M1(+E2))	+0.008 *6*		
		8582.9	100	0.0	1/2$^+$				
8601.0	(5/2$^+$)	2709.0	22.5	5892.1	9/2$^+$				
		3257.9	3.7	5342.84	9/2$^+$				
		3484.8	1.2	5115.2	5/2$^+$				
		3817.3	3.3	4784.7	5/2$^+$				
		3966.5	24.5	4633.58	7/2$^+$				
		4169.5	12.5	4430.84	7/2$^-$				
		4409.8	4.7	4191.01	5/2$^+$				
		5185.9	100	3414.58	7/2$^+$				
		5305.5	20.4	3294.90	5/2$^+$				
		6366.5	10.0	2233.63	5/2$^+$				
		8599.7	1.4	0.0	1/2$^+$				
8641.2	5/2$^+$	2653.2	1.96	5987.9	(3/2)$^+$				
		2867.6	4.1	5772.7	7/2$^+$				
		3525.0	8.4	5115.2	5/2$^+$				
		4006.7	4.1	4633.58	7/2$^+$				
		4048.4	5.3	4592.5	3/2$^+$				
		4209.7	7.7	4430.84	7/2$^-$				
		4450.0	8.6	4191.01	5/2$^+$	(M1+E2)	+0.6	1.22×10^{-3} *2*	α(K)=2.316×10^{-6} *32*; α(L)=1.721×10^{-7} *24*; α(M)=1.308×10^{-8} *18* α(IPF)=0.001215 *17*

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8641.2	5/2$^+$	5134.6	7.8	3506.1	3/2$^+$	(M1(+E2))	+0.09 *9*	1.37×10^{-3} *2*	α(K)=1.896×10^{-6} *27*; α(L)=1.409×10^{-7} *20*; α(M)=1.071×10^{-8} *15* α(IPF)=0.001370 *20*
		5226.1	2.8	3414.58	7/2$^+$				
		5345.7	13.7	3294.90	5/2$^+$	(M1+E2)	−0.13 *6*	1.43×10^{-3} *2*	α(K)=1.798×10^{-6} *25*; α(L)=1.336×10^{-7} *19*; α(M)=1.016×10^{-8} *14* α(IPF)=0.001428 *20*
		6406.7	31	2233.63	5/2$^+$	(M1(+E2))	−0.03 *4*		
		7374.1	100	1266.08	3/2$^+$	(M1+E2)	−0.042 *3*		
		8639.9	0.20	0.0	1/2$^+$				
8649.5	3/2$^+$	2661.5	1.20	5987.9	(3/2)$^+$				
		3865.8	1.20	4784.7	5/2$^+$				
		4056.7	0.80	4592.5	3/2$^+$				
		4388.8	3.6	4260.4	3/2$^+$				
		4458.3	1.73	4191.01	5/2$^+$	(M1+E2)	−1.1 *8*	0.00126 *7*	α(K)=2.33×10^{-6} *4*; α(L)=1.731×10^{-7} *33*; α(M)=1.315×10^{-8} *25* α(IPF)=0.00126 *7*
		5142.9	0.80	3506.1	3/2$^+$				
		5354.0	4.5	3294.90	5/2$^+$	(M1+E2)	+0.10 *6*	1.43×10^{-3} *2*	α(K)=1.794×10^{-6} *25*; α(L)=1.333×10^{-7} *19*; α(M)=1.013×10^{-8} *14* α(IPF)=0.001429 *20*
		5514.7	14.7	3134.3	1/2$^+$	(M1+E2)	−3.7 *3*	1.62×10^{-3} *2*	α(K)=1.760×10^{-6} *25*; α(L)=1.308×10^{-7} *18*; α(M)=9.94×10^{-9} *14* α(IPF)=0.001618 *23*
		6415.0	1.20	2233.63	5/2$^+$	(M1+E2)	−0.28 *5*		
		7382.4	100	1266.08	3/2$^+$	(M1+E2)	+0.045 *3*		
		8648.2	3.6	0.0	1/2$^+$				
8705.23	(13/2$^-$)	628.4[a] *2*	5.1[a] *4*	8076.91	11/2$^{(-)}$				
		1881.9 *9*	100 *9*	6823.91	11/2$^-$	M1+E2	+0.20 *6*	0.0002090 *33*	B(M1)(W.u.)=0.0154 *+32−24*; B(E2)(W.u.)=0.8 *+6−4* α(K)=8.40×10^{-6} *12*; α(L)=6.25×10^{-7} *9*; α(M)=4.75×10^{-8} *7* α(IPF)=0.0001999 *32* E_γ: unweighted average of 1883.7 *4* from (^{20}Ne,pγ), 1880.8 *5* from (^{12}C,αpγ), and 1881.3 *4* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Others: 100 *10* from (^{20}Ne,pγ) and 100 *16* from (^{12}C,αpγ). Mult.,δ: D+Q with ΔJ=1 and δ from γγ(ADO) in (^{16}O,2αpγ); E1+M2 ruled out by RUL.
		1909.2[a] *5*	9.5[a] *11*	6796.0	9/2$^-$				

$^{31}_{15}P_{16}$-57

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8705.23	(13/2$^-$)	2203.9 *6*	7.1 *24*	6501.3	9/2$^-$				E_γ: weighted average of 2205.3 *15* from (^{20}Ne,pγ), 2204.2 *9* from (^{12}C,αpγ), and 2203.6 *6* from (^{16}O,2αpγ). I_γ: unweighted average of 4.7 *8* from (^{20}Ne,pγ) and 9.5 *21* from (^{16}O,2αpγ).
		2251.6[a] *5*	8.4[a] *11*	6453.49	11/2$^+$				
8729.1	3/2$^+$	3714	0.12	5014.9	(3/2$^+$)				
		3945.4	2.6	4784.7	5/2$^+$				
		4468.4	1.1	4260.4	3/2$^+$				
		5222.5	0.24	3506.1	3/2$^+$				
		5433.6	3.5	3294.90	5/2$^+$				
		5594.3	3.6	3134.3	1/2$^+$				
		6494.6	7.5	2233.63	5/2$^+$	(M1+E2)	−0.20 *7*		
		7462.0	0.48	1266.08	3/2$^+$				
		8727.8	100	0.0	1/2$^+$	(M1+E2)			δ: +0.022 *5* or −1.83 *3* from (p,γ).
8730.5	3/2$^+$	1799.0[c]	<8.1	6931.4	5/2$^+$				
		2120.0	0.68	6610.4	3/2$^-$				
		2742.5	0.135	5987.9	(3/2)$^+$				
		2956.8[c]	<8.1	5772.7	7/2$^+$				
		3473.5	0.54	5256.8	1/2$^+$				
		3614.3	0.41	5115.2	5/2$^+$				
		3715	4.1	5015.2	3/2$^-$				
		3946.8	0.81	4784.7	5/2$^+$				
		4137.7	2.7	4592.5	3/2$^+$				
		4539.2[c]	<4.1	4191.01	5/2$^+$				
		5223.9	2.43	3506.1	3/2$^+$				
		5435.0	2.43	3294.90	5/2$^+$				
		5595.7	4.9	3134.3	1/2$^+$				
		6496.0	14.9	2233.63	5/2$^+$	(M1+E2)	−0.01 *13*		
		7463.4	1.22	1266.08	3/2$^+$	(M1+E2)	+0.12 *5*		
		8729.2	100	0.0	1/2$^+$	(M1(+E2))	+0.02 *2*		
8738.0	3/2$^+$	3178.9	10.0	5558.9	3/2$^+$	(M1(+E2))	−0.15 *19*	0.000738 *15*	α(K)=3.70×10^{-6} *5*; α(L)=2.75×10^{-7} *4*; α(M)=2.092×10^{-8} *30* α(IPF)=0.000734 *15*
		3481.0	3.8	5256.8	1/2$^+$				
		3621.8	3.8	5115.2	5/2$^+$				
		3722.9	35	5015.2	3/2$^-$	D+Q	−0.75 *28*		Mult.: it is E1+M2 from level scheme, but the strong M2 component is inconsistent with measured proton resonance strength and RUL. It is possible this transition could feed the 5014.9, (3/2$^+$) level instead of

$^{31}_{15}P_{16}$-58

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									5015.2, 3/2$^-$ level as claimed by 2005Vo24 in (p,γ), if δ can be confirmed.
8738.0	3/2$^+$	3954.3	32	4784.7	5/2$^+$	(M1(+E2))	−0.02 *15*	1.02×10^{-3} *2*	α(K)=2.71×10^{-6} *4*; α(L)=2.011×10^{-7} *28*; α(M)=1.529×10^{-8} *21* α(IPF)=0.001013 *15*
		4145.2	3.5	4592.5	3/2$^+$				
		5231.4	7.0	3506.1	3/2$^+$				
		5442.5	100	3294.90	5/2$^+$	(M1+E2)	−0.24 *6*	1.46×10^{-3} *2*	α(K)=1.758×10^{-6} *25*; α(L)=1.306×10^{-7} *18*; α(M)=9.93×10^{-9} *14* α(IPF)=0.001457 *21*
		5603.2	23.8	3134.3	1/2$^+$	(M1+E2)	+20 *14*	1.65×10^{-3} *2*	α(K)=1.726×10^{-6} *24*; α(L)=1.282×10^{-7} *18*; α(M)=9.75×10^{-9} *14* α(IPF)=0.001649 *23*
		6503.5	22.2	2233.63	5/2$^+$	(M1+E2)	−0.8 *4*		
		7470.9	17.3	1266.08	3/2$^+$	(M1+E2)	+1.2 *6*		
		8736.7	11.4	0.0	1/2$^+$	(M1+E2)	−0.20 *7*		
8757.3	5/2$^+$	3742	1.5	5015.2	3/2$^-$				
		3973.6	6.4	4784.7	5/2$^+$				
		4122.8	1.1	4633.58	7/2$^+$				
		4164.5	3.6	4592.5	3/2$^+$				
		4325.8	7.3	4430.84	7/2$^-$				
		5250.7	2.2	3506.1	3/2$^+$				
		5342.2	44	3414.58	7/2$^+$	(M1+E2)	−0.13 *2*	1.43×10^{-3} *2*	α(K)=1.800×10^{-6} *25*; α(L)=1.337×10^{-7} *19*; α(M)=1.016×10^{-8} *14* α(IPF)=0.001427 *20*
		5622.5	1.8	3134.3	1/2$^+$				
		6522.8	13.6	2233.63	5/2$^+$	(M1+E2)	+0.09 *5*		
		7490.2	100	1266.08	3/2$^+$	(M1+E2)	+0.206 *3*		
		8756.0	0.73	0.0	1/2$^+$				
8763.3	1/2$^+$	2302.4	0.88	6460.8	5/2$^+$				
		2426.6	2.50	6336.6	1/2$^+$				
		3748	9.4	5015.2	3/2$^-$				
		5256.7	1.88	3506.1	3/2$^+$				
		5467.8	0.50	3294.90	5/2$^+$				
		5628.5	3.8	3134.3	1/2$^+$				
		6528.8	1.13	2233.63	5/2$^+$				
		7496.2	5.0	1266.08	3/2$^+$				
		8762.0	100	0.0	1/2$^+$				
8840.0	7/2$^-$	1908.5	44	6931.4	5/2$^+$				
		2440.9	100	6399.0	7/2$^{(-)}$	(M1(+E2))	+0.07 *9*	0.000437 *6*	α(K)=5.51×10^{-6} *8*; α(L)=4.10×10^{-7} *6*; α(M)=3.12×10^{-8} *4* α(IPF)=0.000431 *6*

$^{31}_{15}P_{16}$-59

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8840.0	7/2$^-$	2947.9	15.6	5892.1	9/2$^+$				
		3167.4	14.8	5672.4	5/2				
		3825	2.6	5014.9	(3/2$^+$)				
		4056.3	27	4784.7	5/2$^+$				
		4408.5	35	4430.84	7/2$^-$				
		4648.7	18.9	4191.01	5/2$^+$				
		5424.9	59	3414.58	7/2$^+$				
		5544.5	13.3	3294.90	5/2$^+$				
		6605.4	36	2233.63	5/2$^+$	(E1+M2)	+0.03 *2*		
		8838.6	3.7	0.0	1/2$^+$	[E3]			
8902.9	1/2$^+$	1589.2	2.4	7313.7	(1/2,3/2)$^+$				
		2914.9	5.6	5987.9	(3/2)$^+$				
		3343.8	2.9	5558.9	3/2$^+$				
		3888	2.9	5014.9	(3/2$^+$)				
		4310.1	14.9	4592.5	3/2$^+$				
		4642.1	1.3	4260.4	3/2$^+$				
		5396.3	100	3506.1	3/2$^+$	(M1+E2)		0.00152 *8*	α(K)=1.795×10^{-6} *32*; α(L)=1.334×10^{-7} *24*; α(M)=1.014×10^{-8} *18* α(IPF)=0.00152 *8* δ: −0.12 *7* or −2.4 *5* from (p,γ).
		5768.0	78	3134.3	1/2$^+$				
		6668.3	2.9	2233.63	5/2$^+$				
		7635.8	8.4	1266.08	3/2$^+$				
		8901.5	3.1	0.0	1/2$^+$				
8909.7	5/2$^+$	2315.3	16.9	6595.5	(5/2)$^-$				
		2921.7	7.7	5987.9	(3/2)$^+$				
		3237.1	100	5672.4	5/2	D(+Q)	−0.01 *9*		
		3350.6	26	5558.9	3/2$^+$	(M1(+E2))	+0.03 *6*	0.000801 *11*	α(K)=3.43×10^{-6} *5*; α(L)=2.55×10^{-7} *4*; α(M)=1.936×10^{-8} *27* α(IPF)=0.000797 *11*
		3894	3.9	5015.2	3/2$^-$				
		4275.2	9.6	4633.58	7/2$^+$				
		4478.2	54	4430.84	7/2$^-$				
		4648.9	2.7	4260.4	3/2$^+$				
		4718.4	10.8	4191.01	5/2$^+$				
		5403.1	4.6	3506.1	3/2$^+$				
		5494.6	13.1	3414.58	7/2$^+$				
		5614.2	15.8	3294.90	5/2$^+$				
		6675.1	32	2233.63	5/2$^+$				
		7642.6	92	1266.08	3/2$^+$	(M1+E2)	+0.07 *1*		
		8908.3	3.5	0.0	1/2$^+$				
8935.8	3/2$^+$	1794.6	2.8	7141.1	1/2$^+$				
		3263.2	13.9	5672.4	5/2				
		3678.8	1.4	5256.8	1/2$^+$				

$^{31}_{15}P_{16}$-60

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
8935.8	3/2$^+$	3819.5	18.1	5115.2	5/2$^+$				
		3920	4.4	5015.2	3/2$^-$				
		4152.1	42	4784.7	5/2$^+$	(M1(+E2))		0.00115 *8*	α(K)=2.57×10^{-6} *5*; α(L)=1.91×10^{-7} *4*; α(M)=1.451×10^{-8} *30* α(IPF)=0.00115 *8* δ: +0.02 *4*, −0.16 *8* or −0.03 *5* from (p,γ).
		4675.0	18.3	4260.4	3/2$^+$				
		5429.2	10.3	3506.1	3/2$^+$				
		5640.2	6.4	3294.90	5/2$^+$				
		5800.9	11.7	3134.3	1/2$^+$				
		6701.2	100.0 *28*	2233.63	5/2$^+$	(M1+E2)	−0.17 *5*		
		7668.7	18.3	1266.08	3/2$^+$				
		8934.4	47.2 *28*	0.0	1/2$^+$	(M1+E2)			δ: −0.255 *5* or −1.02 *1* from (p,γ).
8985.9	3/2	x							40% of the absolute γ-branching is unaccounted based on (p,γ). Additional information 190.
		8984.5	100	0.0	1/2$^+$	D+Q			δ: +0.010 *5* or −1.78 *1* from (p,γ).
9009	5/2$^+$	2610.0	10.6	6399.0	7/2$^{(-)}$				
		3021.0	3.1	5987.9	(3/2)$^+$				
		3235.4	26	5772.7	7/2$^+$				
		3478.9	16.6	5530.0	(5/2)$^+$				
		4225.4	2.50	4784.7	5/2$^+$				
		4374.6	15.0	4633.58	7/2$^+$				
		4416.3	18.8	4592.5	3/2$^+$				
		4577.5	12.8	4430.84	7/2$^-$				
		4817.8	100	4191.01	5/2$^+$				
		5502.5	41	3506.1	3/2$^+$	(M1+E2)	+0.15 *2*	1.47×10^{-3} *2*	α(K)=1.731×10^{-6} *24*; α(L)=1.286×10^{-7} *18*; α(M)=9.78×10^{-9} *14* α(IPF)=0.001466 *21*
		5594.0	5.9	3414.58	7/2$^+$				
		5874.2	3.1	3134.3	1/2$^+$				
		6774.5	18.8	2233.63	5/2$^+$	(M1+E2)	+0.64 *10*		
		7741.9	4.4	1266.08	3/2$^+$				
		9007.7	41	0.0	1/2$^+$	(E2)			
9046.1	3/2$^-$	2665.2	0.63	6380.8	(3/2)$^+$				
		4031	0.88	5014.9	(3/2$^+$)				
		4262.4	0.25	4784.7	5/2$^+$				
		4453.3	2.50	4592.5	3/2$^+$				
		4785.3	1.13	4260.4	3/2$^+$				
		5750.5	1.25	3294.90	5/2$^+$				
		5911.2	6.0	3134.3	1/2$^+$				
		6811.5	0.63	2233.63	5/2$^+$				

$^{31}_{15}P_{16}$-61

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
9046.1	$3/2^-$	7778.9	11.8	1266.08	$3/2^+$				
		9044.7	100	0.0	$1/2^+$	(E1(+M2))	−0.008 *5*		δ: other: −1.70 *1* also from (p,γ) giving a large M2 component is unlikely based on measured proton resonance strength and RUL.
9052.7	$(5/2)^+$	2121.2	9.1	6931.4	$5/2^+$				
		2143.0	30	6909.6	$(3/2)^-$				
		2458.3	9.1	6595.5	$(5/2)^-$				
		2653.6	36	6399.0	$7/2^{(-)}$				
		2671.8	20.5	6380.8	$(3/2)^+$				
		3380.1	41	5672.4	5/2				
		4037	22.7	5015.2	$3/2^-$				
		4459.9	32	4592.5	$3/2^+$				
		4791.9	4.6	4260.4	$3/2^+$				
		4861.4	13.6	4191.01	$5/2^+$				
		5546.1	32	3506.1	$3/2^+$				
		5637.5	100	3414.58	$7/2^+$				
		5757.1	2.3	3294.90	$5/2^+$				
		6818.1	43	2233.63	$5/2^+$				
		7785.5	59	1266.08	$3/2^+$				
9067.1	$5/2^+$	2606.2	1.9	6460.8	$5/2^+$				
		3079.0	3.6	5987.9	$(3/2)^+$				
		3536.9	7.6	5530.0	$(5/2)^+$	(M1+E2)	+0.52 *12*	0.000899 *17*	α(K)=3.20×10^{-6} *5*; α(L)=2.376×10^{-7} *34*; α(M)=1.806×10^{-8} *26* α(IPF)=0.000896 *17* δ: if J(5530)=5/2 (1969Wo01) in (p,γ).
		4283.4	8.8	4784.7	$5/2^+$				
		4432.6	50	4633.58	$7/2^+$				
		4474.3	4.3	4592.5	$3/2^+$				
		4635.5	3.6	4430.84	$7/2^-$				
		4875.8	7.9	4191.01	$5/2^+$				
		5560.5	1.2	3506.1	$3/2^+$				
		5651.9	16.2	3414.58	$7/2^+$				
		5771.5	23.1	3294.90	$5/2^+$				
		5932.2	1.2	3134.3	$1/2^+$				
		6832.5	100	2233.63	$5/2^+$	(M1+E2)	−0.07 *1*		
		7799.9	5.5	1266.08	$3/2^+$				
		9065.7	3.3	0.0	$1/2^+$				
9113.4	$7/2^-$	2714.3	19.1	6399.0	$7/2^{(-)}$				
		3034.4	1.3	6078.53	$9/2^+$				
		3221.3	6.5	5892.1	$9/2^+$				
		3440.8	1.5	5672.4	5/2				
		3997.1	1.5	5115.2	$5/2^+$				
		4098	1.1	5015.2	$3/2^-$				

$^{31}_{15}P_{16}$-62

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]
9113.4	7/2$^-$	4329.7	13	4784.7	5/2$^+$		
		4478.9	5.2	4633.58	7/2$^+$		
		4922.1	16.5	4191.01	5/2$^+$		
		5698.2	39	3414.58	7/2$^+$		
		5817.8	11.3	3294.90	5/2$^+$		
		6878.8	100	2233.63	5/2$^+$	(E1(+M2))	−0.01 *3*
		7846.2	0.44	1266.08	3/2$^+$	[M2]	
		9112.0	0.65	0.0	1/2$^+$	[E3]	
9115.5	5/2$^+$	2734.6	1.6	6380.8	(3/2)$^+$		
		2882.0	2.0	6233.4	(7/2)$^+$		
		3341.8	4.9	5772.7	7/2$^+$		
		3556.4	14.3	5558.9	3/2$^+$		
		3585.3	12.5	5530.0	(5/2)$^+$		
		4331.8	7.4	4784.7	5/2$^+$		
		4481.0	8.2	4633.58	7/2$^+$		
		4522.6	18	4592.5	3/2$^+$		
		4924.2	14.5	4191.01	5/2$^+$		
		5608.9	12.7	3506.1	3/2$^+$		
		5819.9	9.8	3294.90	5/2$^+$		
		6880.9	100	2233.63	5/2$^+$	(M1+E2)	−0.07 *1*
		9114.1	0.4	0.0	1/2$^+$		
9128.5	5/2$^+$	2747.6	10.7	6380.8	(3/2)$^+$		
		2895	10.7	6233.4	(7/2)$^+$		
		3236.4	21.8	5892.1	9/2$^+$		
		3598.3	5.0	5530.0	(5/2)$^+$		
		4344.8	7.5	4784.7	5/2$^+$		
		4493.9	100	4633.58	7/2$^+$		
		4535.6	8.2	4592.5	3/2$^+$		
		4696.9	17.5	4430.84	7/2$^-$		
		4867.7	11.1	4260.4	3/2$^+$		
		4937.2	5.4	4191.01	5/2$^+$		
		5621.9	20.4	3506.1	3/2$^+$		
		5713.3	24.3	3414.58	7/2$^+$		
		5832.9	13.2	3294.90	5/2$^+$		
		5993.6	3.2	3134.3	1/2$^+$		
		6893.9	64	2233.63	5/2$^+$	(M1+E2)	+1.18 *9*
		7861.3	19.6	1266.08	3/2$^+$		
		9127.1	25.0	0.0	1/2$^+$		
9130.9	5/2$^+$	2288.9	6.9	6841.9	(5/2)$^-$		
		2520.4	10.0	6610.4	3/2$^-$		
		3142.8	3.1	5987.9	(3/2)$^+$		
		3600.7	6.6	5530.0	(5/2)$^+$		

$^{31}_{15}P_{16}$-63

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
9130.9	$5/2^+$	4347.2	45	4784.7	$5/2^+$				
		4496.3	22.4	4633.58	$7/2^+$				
		4699.3	55	4430.84	$7/2^-$				
		4870.1	20.7	4260.4	$3/2^+$				
		5715.7	5.5	3414.58	$7/2^+$				
		5996.0	66	3134.3	$1/2^+$				
		6896.3	2.8	2233.63	$5/2^+$				
		7863.7	100	1266.08	$3/2^+$	(M1+E2)	−0.03 *1*		
		9129.5	1.38	0.0	$1/2^+$				
9154.2	$7/2^{(-)}$	3075.2	8.2	6078.53	$9/2^+$				
		3380.5	6.8	5772.7	$7/2^+$				
		3811.0	34	5342.84	$9/2^+$				
		4370.5	4.1	4784.7	$5/2^+$				
		4519.6	1.14	4633.58	$7/2^+$				
		4962.9	34	4191.01	$5/2^+$				
		5647.5	3.6	3506.1	$3/2^+$				
		5739.0	22.3	3414.58	$7/2^+$				
		6919.6	100	2233.63	$5/2^+$	(E1+M2)	+0.20 *2*		
		7887.0	13.0	1266.08	$3/2^+$				
9156.2	$3/2^{(+)}$	2775.3	4.2	6380.8	$(3/2)^+$				
		3597.1	0.78	5558.9	$3/2^+$				
		3899.1	1.41	5256.8	$1/2^+$				
		4141	1.72	5014.9	$(3/2^+)$				
		4563.3	1.72	4592.5	$3/2^+$				
		4895.4	1.56	4260.4	$3/2^+$				
		4964.9	2.8	4191.01	$5/2^+$				
		5649.5	3.0	3506.1	$3/2^+$				
		5741.0	0.47	3414.58	$7/2^+$				
		5860.6	12.3	3294.90	$5/2^+$				
		6021.3	1.25	3134.3	$1/2^+$				
		6921.6	15.6	2233.63	$5/2^+$	(M1(+E2))	+0.08 *10*		
		7889.0	9.4	1266.08	$3/2^+$				
		9154.7	100	0.0	$1/2^+$	(M1+E2)			δ: +0.250 *5* or −3.48 *5* from (p,γ).
9175.9	$(13/2)^-$	1099.2[a] *4*	16[a] *6*	8076.91	$11/2^{(-)}$	[M1,E2]			If M1, B(M1)(W.u.)=0.023 *+15−9*. If E2, B(E2)(W.u.)=80 *+60−40*. B(E2)(W.u.)=8×10^1 *+6−4* upper bound exceeds RUL=100 if pure E2.
		1733.7 *6*	13.4 *26*	7442.1	$11/2^+$	(E1)		0.000455 *6*	B(E1)(W.u.)=1.5×10^{-4} *+8−5* α(K)=6.28×10^{-6} *9*; α(L)=4.67×10^{-7} *7*; α(M)=3.55×10^{-8} *5* α(IPF)=0.000449 *6* E_γ: weighted average of 1733.4 *7* from (^{20}Ne,pγ) and

$^{31}_{15}P_{16}$-64

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									1733.9 *6* from (^{16}O,2αpγ). I_γ: weighted average of 12.5 *26* from (^{20}Ne,pγ) and 18 *6* from (^{16}O,2αpγ). Mult.: ΔJ=1 from γγ(DCO) in (^{20}Ne,pγ); E1+M2 from level scheme, but δ(M2/E1)<0.15 from RUL=3 for M2. If M2, B(M2)(W.u.)=2.3×10^2 *+13−7*, exceeds RUL=3.
9175.9	(13/2)$^-$	2351.6[a] *6*	10[a] *2*	6823.91	11/2$^-$	[M1,E2]		0.00045 *5*	α(K)=6.09×10^{-6} *26*; α(L)=4.53×10^{-7} *19*; α(M)=3.44×10^{-8} *15* α(IPF)=0.00044 *5* If M1, B(M1)(W.u.)=0.0015 *+9−5*. If E2, B(E2)(W.u.)=1.2 *+7−4*.
		2722.6 *6*	100 *5*	6453.49	11/2$^+$	(E1)		1.10×10^{-3} *2*	B(E1)(W.u.)=0.00029 *+15−8* α(K)=3.33×10^{-6} *5*; α(L)=2.475×10^{-7} *35*; α(M)=1.881×10^{-8} *26* α(IPF)=0.001097 *15* E_γ: weighted average of 2723.5 *8* from (^{20}Ne,pγ) and 2722.3 *5* from (^{16}O,2αpγ). I_γ: from (^{20}Ne,pγ). Other: 100 *8* from (^{16}O,2αpγ). Mult.: ΔJ=1 from γγ(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); E1 from level scheme.
9176.2	3/2$^-$	1394.5	3.7	7781.17	3/2$^-$	(M1(+E2))	+0.07 *2*	5.26×10^{-5} *7*	α(K)=1.393×10^{-5} *20*; α(L)=1.037×10^{-6} *15*; α(M)=7.88×10^{-8} *11* α(IPF)=3.76×10^{-5} *5*
		2565.5	14.3	6610.4	3/2$^-$	(M1(+E2))	−0.05 *2*	0.000489 *7*	α(K)=5.10×10^{-6} *7*; α(L)=3.80×10^{-7} *5*; α(M)=2.88×10^{-8} *4* α(IPF)=0.000484 *7*
		2839.3	1.84	6336.6	1/2$^+$	(E1(+M2))	+0.01 *2*	1.17×10^{-3} *2*	α(K)=3.15×10^{-6} *4*; α(L)=2.343×10^{-7} *33*; α(M)=1.781×10^{-8} *25* α(IPF)=0.001162 *16*
		3503.4	17.1	5672.4	5/2				
		3616.9	5.3	5558.9	3/2$^+$	(E1(+M2))	0.00 *2*	1.53×10^{-3} *2*	α(K)=2.324×10^{-6} *33*; α(L)=1.727×10^{-7} *24*; α(M)=1.312×10^{-8} *18* α(IPF)=0.001528 *21*
		3918.9	1.22	5256.8	1/2$^+$				
		4161	15.5	5014.9	(3/2$^+$)	D(+Q)	0.00 *1*		
		4583.1	4.1	4592.5	3/2$^+$				
		5669.3	1.84	3506.1	3/2$^+$				
		5880.4	12.5	3294.90	5/2$^+$	(E1+M2)	+0.06 *2*	2.26×10^{-3} *3*	α(K)=1.315×10^{-6} *18*; α(L)=9.76×10^{-8} *14*;

$^{31}_{15}P_{16}$-65

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(M)=7.42×10^{-9} *10* α(IPF)=0.002256 *32*
9176.2	3/2$^-$	6941.4	20.2	2233.63	5/2$^+$	(E1+M2)	+0.11 *2*		
		7908.8	6.5	1266.08	3/2$^+$	(E1+M2)	+0.05 *2*		
		9174.5	100	0.0	1/2$^+$	(E1+M2)	+0.07 *1*		
9206.1	7/2$^+$	3314.0	4.5	5892.1	9/2$^+$				
		3675.9	7.5	5530.0	(5/2)$^+$				
		3862.9	2.7	5342.84	9/2$^+$				
		4191	12.8	5014.9	(3/2$^+$)				
		4422.4	4.7	4784.7	5/2$^+$				
		4571.5	0.94	4633.58	7/2$^+$				
		5014.8	2.34	4191.01	5/2$^+$				
		5910.5	100	3294.90	5/2$^+$	(M1+E2)	+0.10 *8*	1.57×10^{-3} *2*	α(K)=1.577×10^{-6} *22*; α(L)=1.172×10^{-7} *16*; α(M)=8.91×10^{-9} *12* α(IPF)=0.001564 *22*
		6971.5	9.5	2233.63	5/2$^+$				
		7938.9	10.2	1266.08	3/2$^+$				
		9204.6	1.1	0.0	1/2$^+$	[M3]			
9226.3	1/2$^-$	2085.1	2.3	7141.1	1/2$^+$				
		2615.8	4.2	6610.4	3/2$^-$				
		2730.1	4.9	6497.1	3/2$^-$				
		2845.4	3.2	6380.8	(3/2)$^+$				
		4211	35	5014.9	(3/2$^+$)				
		5719.6	8.3	3506.1	3/2$^+$				
		6091.4	1.8	3134.3	1/2$^+$				
		7959.1	100	1266.08	3/2$^+$	(E1+M2)			δ: −0.12 *4* or +2.3 *2* from (p,γ).
		9224.8	17.5	0.0	1/2$^+$				
9240.7	3/2$^+$	2630.2	4.0	6610.4	3/2$^-$				
		2744.5	1.67	6497.1	3/2$^-$				
		3568.1	2.7	5672.4	5/2				
		3681.6	8.7	5558.9	3/2$^+$				
		4124.4	17.3	5115.2	5/2$^+$				
		4225	21.7	5015.2	3/2$^-$				
		4457.0	53	4784.7	5/2$^+$				
		4647.8	2.33	4592.5	3/2$^+$				
		4979.9	11.7	4260.4	3/2$^+$				
		5049.4	5.7	4191.01	5/2$^+$				
		5734.0	9.3	3506.1	3/2$^+$				
		5945.1	4.3	3294.90	5/2$^+$				
		6105.8	18.7	3134.3	1/2$^+$				
		7006.0	70	2233.63	5/2$^+$	(M1+E2)	+0.14 *3*		
		7973.5	2.00	1266.08	3/2$^+$				
		9239.2	100	0.0	1/2$^+$	(M1+E2)			δ: +0.36 *1* or −5.55 *7* from (p,γ).

$^{31}_{15}P_{16}$-66

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
9252.9	$(7/2)^-$	3206.3	15.7	6046.4	$7/2^+$		
		3360.8	14.7	5892.1	$9/2^+$		
		3479.2	3.7	5772.7	$7/2^+$		
		3722.7	35	5530.0	$(5/2)^+$		
		3909.7	6.3	5342.84	$9/2^+$		
		4136.6	8.2	5115.2	$5/2^+$		
		4469.2	5.1	4784.7	$5/2^+$		
		4618.3	2.6	4633.58	$7/2^+$		
		5837.7	100	3414.58	$7/2^+$		
		7018.2	0.78	2233.63	$5/2^+$		
		7985.7	0.39	1266.08	$3/2^+$	[M2]	
		9251.4	3.3	0.0	$1/2^+$	[E3]	
9255.9	$(5/2^+,7/2^-)$	2759.7	11.3	6497.1	$3/2^-$		
		3209.3	10.3	6046.4	$7/2^+$		
		3363.8	12.5	5892.1	$9/2^+$		
		3482.2	4.3	5772.7	$7/2^+$		
		3583.3	1.25	5672.4	5/2		
		3725.7	35	5530.0	$(5/2)^+$		
		3912.7	9.0	5342.84	$9/2^+$		
		4139.6	9.0	5115.2	$5/2^+$		
		4472.2	6.3	4784.7	$5/2^+$		
		4621.3	2.8	4633.58	$7/2^+$		
		4824.3	3.5	4430.84	$7/2^-$		
		5064.6	12.0	4191.01	$5/2^+$		
		5840.7	100	3414.58	$7/2^+$		
		5960.3	15.3	3294.90	$5/2^+$		
		7021.2	12.0	2233.63	$5/2^+$		
		7988.7	0.50	1266.08	$3/2^+$		
		9254.4	5.3	0.0	$1/2^+$		
9290.8	$3/2^-$	2149.6	2.29	7141.1	$1/2^+$		
		2448.8	0.83	6841.9	$(5/2)^-$		
		2909.9	2.50	6380.8	$(3/2)^+$		
		3731.7	1.04	5558.9	$3/2^+$		
		4033.7	2.08	5256.8	$1/2^+$		
		4275	4.2	5015.2	$3/2^-$		
		5030.0	11.0	4260.4	$3/2^+$		
		5784.1	17.5	3506.1	$3/2^+$		
		5995.2	2.08	3294.90	$5/2^+$		
		6155.8	40	3134.3	$1/2^+$	(E1+M2)	δ: +0.05 *4* or +1.54 *10* from (p,γ).
		7056.1	20.8	2233.63	$5/2^+$	(E1+M2)	δ: −0.18 *2* or +5.7 *5* from (p,γ).
		8023.6	4.4	1266.08	$3/2^+$		
		9289.3	100	0.0	$1/2^+$	(E1+M2)	δ: +0.18 *2* or +1.19 *4* from (p,γ).

$^{31}_{15}P_{16}$-67

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9312.9	(13/2$^+$)	1871.0 *6*	67 *33*	7442.1	11/2$^+$			E_γ: weighted average of 1870.6 *9* from (^{12}C,αpγ) and 1871.1 *6* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ).
		2859.4 *6*	100 *11*	6453.49	11/2$^+$	D+Q	+0.25 *10*	E_γ: weighted average of 2860.6 *12* from (^{12}C,αpγ) and 2859.1 *6* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Mult.,δ: D+Q from γγ(ADO) in (^{16}O,2αpγ).
		3233.3 *7*	28 *6*	6078.53	9/2$^+$			E_γ: weighted average of 3232 *3* from (^{12}C,αpγ) and 3233.4 *7* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ).
9319.5	3/2$^{(+)}$	2409.8	1.4	6909.6	(3/2)$^-$			
		2823.3	18.9	6497.1	3/2$^-$			
		2858.6	4.7	6460.8	5/2$^+$			
		4304	31	5015.2	3/2$^-$			
		4726.6	2.5	4592.5	3/2$^+$			
		5058.7	14.7	4260.4	3/2$^+$			
		5812.8	2.2	3506.1	3/2$^+$			
		6184.5	100	3134.3	1/2$^+$			
		8052.2	69	1266.08	3/2$^+$			
		9318.0	33	0.0	1/2$^+$	D+Q	+0.27 *1*	
9358.1		2240.1	27	7117.7	9/2$^+$			
		2856.2	7.9	6501.3	9/2$^-$			
		3466.0	32	5892.1	9/2$^+$			
		3584.4	18.8	5772.7	7/2$^+$			
		3827.8	100	5530.0	(5/2)$^+$			
		4014.9	38	5342.84	9/2$^+$			
		4241.8	1.67	5115.2	5/2$^+$			
		4343	9.6	5014.9	(3/2$^+$)			
		4574.3	3.3	4784.7	5/2$^+$			
		4723.5	54	4633.58	7/2$^+$			
		4926.5	19.6	4430.84	7/2$^-$			
		5166.7	18.3	4191.01	5/2$^+$			
		5851.4	3.3	3506.1	3/2$^+$			
		5942.9	2.50	3414.58	7/2$^+$			
		6062.5	7.9	3294.90	5/2$^+$			
		6223.1	19.2	3134.3	1/2$^+$			
		7123.4	6.3	2233.63	5/2$^+$			
		8090.8	2.5	1266.08	3/2$^+$			
		9356.6	46	0.0	1/2$^+$			
9360.8		2429.3	7.0	6931.4	5/2$^+$			
		2518.8	4.7	6841.9	(5/2)$^-$			
		2766.4	4.0	6595.5	(5/2)$^-$			

$^{31}_{15}P_{16}$-68

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
9360.8		2858.9	4.5	6501.3	$9/2^-$				
		2961.6	15.5	6399.0	$7/2^{(-)}$				
		3281.8	16.0	6078.53	$9/2^+$				
		3468.7	2.8	5892.1	$9/2^+$				
		3587.1	4.7	5772.7	$7/2^+$				
		3688.2	3.0	5672.4	5/2				
		3830.5	3.0	5530.0	$(5/2)^+$				
		4244.5	3.2	5115.2	$5/2^+$				
		4345	2.8	5015.2	$3/2^-$				
		4726.2	7.5	4633.58	$7/2^+$				
		4929.2	4.5	4430.84	$7/2^-$				
		5169.4	10.0	4191.01	$5/2^+$				
		5854.1	1.06	3506.1	$3/2^+$				
		6065.2	100	3294.90	$5/2^+$				
		6225.8	4.3	3134.3	$1/2^+$				
		8093.5	0.85	1266.08	$3/2^+$				
		9359.3	13.6	0.0	$1/2^+$				
9399.7	$1/2^+$	2319.7	5.0	7079.9	$(3/2)^-$				
		3018.7	1.9	6380.8	$(3/2)^+$				
		3062.9	2.7	6336.6	$1/2^+$				
		3840.5	5.0	5558.9	$3/2^+$				
		4384.5	7.3	5014.9	$(3/2^+)$				
		4806.8	5.0	4592.5	$3/2^+$				
		5138.8	58	4260.4	$3/2^+$				
		5893.0	34	3506.1	$3/2^+$				
		6264.7	100	3134.3	$1/2^+$				
		7165.0	1.2	2233.63	$5/2^+$				
		8132.4	65	1266.08	$3/2^+$				
		9398.2	100	0.0	$1/2^+$				
9412.4	$7/2^-$	3013.2	1.6	6399.0	$7/2^{(-)}$				
		3520.3	1.0	5892.1	$9/2^+$				
		3739.8	1.6	5672.4	5/2				
		4069.2	2.1	5342.84	$9/2^+$				
		4296.1	1.2	5115.2	$5/2^+$				
		4628.6	1.3	4784.7	$5/2^+$				
		4777.8	1.0	4633.58	$7/2^+$				
		4980.8	100	4430.84	$7/2^-$				
		5221.0	0.46	4191.01	$5/2^+$				
		5997.2	0.92	3414.58	$7/2^+$	(E1(+M2))	+0.02 *3*	2.29×10^{-3} *3*	α(K)=1.284×10^{-6} *18*; α(L)=9.53×10^{-8} *13*; α(M)=7.25×10^{-9} *10* α(IPF)=0.002288 *32*
		7177.7	3.3	2233.63	$5/2^+$				

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
9412.4	$7/2^-$	8145.1	0.23	1266.08	$3/2^+$	[M2]			
		9410.9	0.23	0.0	$1/2^+$	[E3]			
9440.8	$3/2^{(+)}$	2979.8	2.1	6460.8	$5/2^+$				
		3059.8	14.3	6380.8	$(3/2)^+$				
		3104.0	2.9	6336.6	$1/2^+$				
		3452.7	7.1	5987.9	$(3/2)^+$				
		4324.5	10.4	5115.2	$5/2^+$				
		4425	7.5	5015.2	$3/2^-$				
		4847.9	6.8	4592.5	$3/2^+$				
		5179.9	43	4260.4	$3/2^+$				
		5249.4	43	4191.01	$5/2^+$				
		6145.1	57	3294.90	$5/2^+$				
		6305.8	13.2	3134.3	$1/2^+$				
		7206.1	21.4	2233.63	$5/2^+$				
		8173.5	29	1266.08	$3/2^+$				
		9439.3	100	0.0	$1/2^+$	(M1+E2)			δ: +0.18 *1* or −2.75 *4* from (p,γ).
9448.9	$5/2^+$	2987.9	13.8	6460.8	$5/2^+$				
		3067.9	52	6380.8	$(3/2)^+$				
		3889.7	10	5558.9	$3/2^+$				
		3918.6	44	5530.0	$(5/2)^+$				
		4332.6	23.8	5115.2	$5/2^+$				
		4665.1	76	4784.7	$5/2^+$				
		4814.3	11	4633.58	$7/2^+$				
		4856.0	29	4592.5	$3/2^+$				
		5188.0	5.2	4260.4	$3/2^+$				
		5257.5	22.4	4191.01	$5/2^+$				
		5942.2	4.8	3506.1	$3/2^+$				
		6033.7	45	3414.58	$7/2^+$				
		6153.2	7.1	3294.90	$5/2^+$				
		7214.2	27	2233.63	$5/2^+$				
		8181.6	100	1266.08	$3/2^+$	(M1+E2)	+0.13 *2*		
		9447.4	4.3	0.0	$1/2^+$				
9449.86	$(13/2)^-$	745.3 *6*	100 *14*	8705.23	$(13/2^-)$	(M1)			B(M1)(W.u.)=0.6 *+4−2* E_γ: unweighted average of 745.8 *2* from (^{20}Ne,pγ) and 744.7 *2* from (^{16}O,2αpγ). I_γ: from (^{16}O,2αpγ). Other: 100 *19* from (^{20}Ne,pγ). Mult.: D from ΔJ=0 from $\gamma\gamma$(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); M1 from $\Delta\pi$=(no).
		1106.4[a] *4*	7.1[a] *29*	8343.5	$(11/2^+)$	[E1]		2.84×10^{-5} *4*	B(E1)(W.u.)=0.00037 *+30−17* α(K)=1.331×10^{-5} *19*; α(L)=9.91×10^{-7} *14*;

$^{31}_{15}P_{16}$-70

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(M)=7.53×10^{-8} *11* α(IPF)=1.403×10^{-5} *23*
9449.86	(13/2)$^-$	1373.2[a] *5*	57[a] *7*	8076.91	11/2$^{(-)}$				
		2007.8[a] *7*	14[a] *7*	7442.1	11/2$^+$	[E1]		0.000654 *9*	B(E1)(W.u.)=0.00012 *+10−6* α(K)=5.06×10^{-6} *7*; α(L)=3.76×10^{-7} *5*; α(M)=2.86×10^{-8} *4* α(IPF)=0.000648 *9*
		2627.3 *16*	100 *7*	6823.91	11/2$^-$	M1+E2	≥+0.2	0.00057 *5*	B(M1)(W.u.)<0.023 α(K)=5.10×10^{-6} *18*; α(L)=3.79×10^{-7} *13*; α(M)=2.88×10^{-8} *10* α(IPF)=0.00057 *5* B(E2)(W.u.)=0.19 to 16. E_γ: unweighted average of 2628.8 *9* from (^{20}Ne,pγ) and 2625.7 *6* from (^{16}O,2αpγ). I_γ: <32 in (^{20}Ne,pγ). Mult.,δ: D+Q and δ from γγ(ADO) in (^{16}O,2αpγ) with ΔJ=1; E1+M2 ruled out by RUL.
9476.9	(7/2$^-$)	2545.4	2.0	6931.4	5/2$^+$				
		2974.9	1.3	6501.3	9/2$^-$				
		3243.3	2.7	6233.4	(7/2)$^+$				
		3584.8	4.4	5892.1	9/2$^+$				
		3703.2	0.9	5772.7	7/2$^+$				
		4133.7	3.8	5342.84	9/2$^+$				
		4360.6	1.6	5115.2	5/2$^+$				
		4842.3	8.9	4633.58	7/2$^+$				
		5045.3	3.3	4430.84	7/2$^-$				
		5285.5	22.2	4191.01	5/2$^+$				
		5970.2	4.2	3506.1	3/2$^+$	[M2]		1.28×10^{-3} *2*	α(K)=1.916×10^{-6} *27*; α(L)=1.424×10^{-7} *20*; α(M)=1.083×10^{-8} *15* α(IPF)=0.001281 *18*
		6061.7	5.1	3414.58	7/2$^+$				
		6181.2	24.4	3294.90	5/2$^+$				
		7242.2	100	2233.63	5/2$^+$				
		8209.6	12.9	1266.08	3/2$^+$	[M2]			
		9475.3	24.4	0.0	1/2$^+$	[E3]			
9524.6	3/2$^+$	3063.6	4.4	6460.8	5/2$^+$				
		3143.6	10.3	6380.8	(3/2)$^+$				
		3750.9	30	5772.7	7/2$^+$				
		3965.4	5.9	5558.9	3/2$^+$				
		4408.3	14.4	5115.2	5/2$^+$				
		4740.8	1.9	4784.7	5/2$^+$				
		4890.0	0.94	4633.58	7/2$^+$				

$^{31}_{15}P_{16}$-71

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
9524.6	3/2+	4931.7	8.8	4592.5	3/2+				
		5092.9	28	4430.84	7/2−				
		5333.2	100	4191.01	5/2+	M1+E2	−0.58 *4*	1.46×10^{-3} *2*	α(K)=1.813×10^{-6} *25*; α(L)=1.347×10^{-7} *19*; α(M)=1.024×10^{-8} *14* α(IPF)=0.001462 *21* Mult.: D+Q from γγ(θ) in (p,γ); E1+M2 ruled out based on measured proton resonance and RUL.
		6017.9	34	3506.1	3/2+				
		6109.4	7.8	3414.58	7/2+				
		7289.9	1.6	2233.63	5/2+				
		8257.3	26	1266.08	3/2+				
		9523.0	38	0.0	1/2+	(M1+E2)	+1.7 *10*		
9536.4	5/2+	1849.1	14.4	7687.2?					
		2418.4	6.9	7117.7	9/2+				
		2452.3	41	7084.0	(3/2+,5/2+)				
		2712.1[c]	31	6823.91	11/2−	[E3]		0.000442 *6*	α(K)=7.21×10^{-6} *10*; α(L)=5.36×10^{-7} *8*; α(M)=4.08×10^{-8} *6* α(IPF)=0.000434 *6* E_γ: could belong to a different level at similar energy.
		3081.5[c]	94	6460.8	5/2+	[M3]		0.000363 *5*	α(K)=7.66×10^{-6} *11*; α(L)=5.70×10^{-7} *8*; α(M)=4.33×10^{-8} *6* α(IPF)=0.000354 *5* E_γ: could belong to a different level at similar energy.
		3457.4	38	6078.53	9/2+				
		3644.3	13.1	5892.1	9/2+				
		4006.1	6.9	5530.0	(5/2)+				
		4193.2	47	5342.84	9/2+				
		4420.1	4.4	5115.2	5/2+				
		4521	3.8	5014.9	(3/2+)				
		4901.8	59	4633.58	7/2+				
		5104.7	100	4430.84	7/2−				
		6029.7	11.3	3506.1	3/2+				
		6121.2	18.1	3414.58	7/2+				
		6240.7	18.1	3294.90	5/2+				
		7301.7	5.0	2233.63	5/2+	(M1+E2)	−0.03 *1*		
		8269.1	58	1266.08	3/2+				
		9534.8	57	0.0	1/2+				
9570.5	3/2	2660.8	0.33	6909.6	(3/2)−				
		3582.4	0.11	5987.9	(3/2)+				
		4555	1.44	5015.2	3/2−				
		6063.8	1.78	3506.1	3/2+				

$^{31}_{15}P_{16}$-72

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9570.5	3/2	6435.5	4.7	3134.3	$1/2^+$			
		7335.8	0.67	2233.63	$5/2^+$			
		8303.2	2.1	1266.08	$3/2^+$			
		9568.9	100	0.0	$1/2^+$	D+Q		δ: +0.24 *1* or −3.43 *3* from (p,γ).
9577.8	$7/2^{(-)}$	2646.3	5.0	6931.4	$5/2^+$			
		2967.2	0.77	6610.4	$3/2^-$			
		3178.6	1.15	6399.0	$7/2^{(-)}$			
		4461.5	6.7	5115.2	$5/2^+$			
		4562	8.1	5015.2	$3/2^-$			
		4943.2	11.2	4633.58	$7/2^+$			
		5146.1	8.1	4430.84	$7/2^-$			
		5386.4	12.1	4191.01	$5/2^+$			
		6282.1	29	3294.90	$5/2^+$			
		6442.8	2.12	3134.3	$1/2^+$	[E3]		
		7343.1	100	2233.63	$5/2^+$	(E1(+M2))	−0.04 *2*	
		8310.5	8.3	1266.08	$3/2^+$	[M2]		
9585.0	$(1/2^+,3/2^-)$	2443.8	3.0	7141.1	$1/2^+$			
		3204.0	1.50	6380.8	$(3/2)^+$			
		3248.2	4.5	6336.6	$1/2^+$			
		3596.9	2.8	5987.9	$(3/2)^+$			
		4025.8	3.3	5558.9	$3/2^+$			
		4327.9	3.0	5256.8	$1/2^+$			
		4570	16.3	5014.9	$(3/2^+)$			
		6078.3	6.5	3506.1	$3/2^+$			
		6289.3	2.50	3294.90	$5/2^+$			
		6450.0	53	3134.3	$1/2^+$			
		7350.3	9.3	2233.63	$5/2^+$			
		8317.7	45	1266.08	$3/2^+$	D+Q	+0.36 *2*	
		9583.4	100	0.0	$1/2^+$	D(+Q)	0.00 *2*	
9593.8	3/2	3212.8	10.3	6380.8	$(3/2)^+$			
		3921.1	1.8	5672.4	5/2			
		4578	7.4	5015.2	$3/2^-$			
		4810.0	14.5	4784.7	$5/2^+$			
		5402.4	8.7	4191.01	$5/2^+$			
		6087.1	10.3	3506.1	$3/2^+$			
		6298.1	1.3	3294.90	$5/2^+$			
		6458.8	3.7	3134.3	$1/2^+$			
		7359.1	7.9	2233.63	$5/2^+$			
		8326.5	97	1266.08	$3/2^+$	D(+Q)	−0.01 *3*	
		9592.2	100	0.0	$1/2^+$			
9598.5	$3/2^{(-)}$	3199.3	2.6	6399.0	$7/2^{(-)}$			

$^{31}_{15}P_{16}$-73

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9598.5	$3/2^{(-)}$	4583	13.3	5015.2	$3/2^-$			
		5005.6	7.7	4592.5	$3/2^+$			
		5166.8	6.2	4430.84	$7/2^-$			
		5337.6	9.7	4260.4	$3/2^+$			
		5407.1	2.1	4191.01	$5/2^+$			
		6091.8	3.3	3506.1	$3/2^+$			
		6302.8	14.1	3294.90	$5/2^+$			
		6463.5	6.2	3134.3	$1/2^+$			
		7363.8	19.5	2233.63	$5/2^+$			
		8331.2	72	1266.08	$3/2^+$	D+Q	+0.84 *6*	
		9596.9	100	0.0	$1/2^+$	D(+Q)	0.00 *2*	
9599.8	$(13/2^+)$	3145.7[a] *7*	45[a] *20*	6453.49	$11/2^+$			
		3707.6[a] *7*	100[a] *50*	5892.1	$9/2^+$			
		4257.1[a] *8*	30[a] *15*	5342.84	$9/2^+$			
9611.9		3230.9	11.1	6380.8	$(3/2)^+$			
		3719.8	2.8	5892.1	$9/2^+$			
		4081.6	8.3	5530.0	$(5/2)^+$			
		4495.6	9.4	5115.2	$5/2^+$			
		4828.1	23.6	4784.7	$5/2^+$			
		4977.3	4.4	4633.58	$7/2^+$			
		5420.5	6.9	4191.01	$5/2^+$			
		6196.6	2.8	3414.58	$7/2^+$			
		6316.2	44	3294.90	$5/2^+$			
		7377.2	36	2233.63	$5/2^+$			
		8344.6	100	1266.08	$3/2^+$			Mult.: $\gamma(\theta)$ from (p,γ) consistent with $\Delta J=0$ or $\Delta J=2$.
		9610.3	28	0.0	$1/2^+$			
9720.5		2602.5	6.4	7117.7	$9/2^+$			
		3218.5	6.0	6501.3	$9/2^-$			
		3265.6	8.4	6460.8	$5/2^+$			
		3321.3	7.6	6399.0	$7/2^{(-)}$			
		3673.9	30	6046.4	$7/2^+$			
		3946.7	2.00	5772.7	$7/2^+$			
		4047.8	8.0	5672.4	$5/2$			
		4377.3	2.00	5342.84	$9/2^+$			
		4463.4	2.40	5256.8	$1/2^+$			
		4705	16.0	5015.2	$3/2^-$			
		4936.7	2.00	4784.7	$5/2^+$			
		5085.9	1.60	4633.58	$7/2^+$			
		5127.5	2.00	4592.5	$3/2^+$			
		5288.8	8.4	4430.84	$7/2^-$			
		5459.6	32	4260.4	$3/2^+$			

$^{31}_{15}P_{16}$-74

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9720.5		5529.1	4.0	4191.01	$5/2^+$			
		6213.7	56	3506.1	$3/2^+$			
		6305.2	6.0	3414.58	$7/2^+$			
		6424.8	6.0	3294.90	$5/2^+$			
		6585.4	2.40	3134.3	$1/2^+$			
		7485.7	31	2233.63	$5/2^+$			
		8453.1	60	1266.08	$3/2^+$	D+Q		δ: −0.07 *3* or +2.05 *15* from (p,γ).
		9718.9	100	0.0	$1/2^+$			
9756.5	$5/2^+$	2846.8	1.72	6909.6	$(3/2)^-$			
		3357.3	1.72	6399.0	$7/2^{(-)}$			
		3375.5	1.72	6380.8	$(3/2)^+$			
		3864.3	3.5	5892.1	$9/2^+$			
		4972.7	1.72	4784.7	$5/2^+$			
		5324.8	6.9	4430.84	$7/2^-$			
		5565.1	3.5	4191.01	$5/2^+$			
		6249.7	5.2	3506.1	$3/2^+$			
		6341.2	8.6	3414.58	$7/2^+$			
		6621.4	1.72	3134.3	$1/2^+$			
		7521.7	20.7	2233.63	$5/2^+$			
		8489.1	100	1266.08	$3/2^+$	(M1)		
		9754.9	15.5	0.0	$1/2^+$			
9760.4	$5/2^+$	4087.7	2.8	5672.4	5/2			
		4644.0	2.8	5115.2	$5/2^+$			
		5125.7	5.6	4633.58	$7/2^+$			
		5167.4	4.2	4592.5	$3/2^+$			
		5328.7	1.41	4430.84	$7/2^-$			
		6253.6	1.41	3506.1	$3/2^+$			
		6345.1	1.41	3414.58	$7/2^+$			
		7525.6	21.1	2233.63	$5/2^+$			
		8493.0	100	1266.08	$3/2^+$	(M1)		
9765.2	$3/2^-$	3154.6	3.9	6610.4	$3/2^-$			
		4206.0	3.9	5558.9	$3/2^+$			
		4648.8	1.96	5115.2	$5/2^+$			
		4750	7.8	5014.9	$(3/2^+)$			
		5172.2	11.8	4592.5	$3/2^+$			
		5573.8	9.8	4191.01	$5/2^+$			
		6469.5	7.8	3294.90	$5/2^+$			
		6630.1	3.9	3134.3	$1/2^+$			
		7530.4	15.7	2233.63	$5/2^+$			
		8497.8	100	1266.08	$3/2^+$	(E1+M2)	−0.24 *2*	
		9763.5	29	0.0	$1/2^+$			

$^{31}_{15}P_{16}$-75

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9843.6		3444.4	3.7	6399.0	$7/2^{(-)}$			
		3951.4	3.7	5892.1	$9/2^+$			
		5059.8	18.5	4784.7	$5/2^+$			
		5250.6	22.2	4592.5	$3/2^+$			
		5411.9	3.7	4430.84	$7/2^-$			
		5582.7	11.1	4260.4	$3/2^+$			
		5652.1	22.2	4191.01	$5/2^+$			
		6336.8	14.8	3506.1	$3/2^+$			
		6547.9	14.8	3294.90	$5/2^+$			
		6708.5	3.7	3134.3	$1/2^+$			
		7608.8	100	2233.63	$5/2^+$			
		8576.2	96	1266.08	$3/2^+$	D(+Q)	+0.01 *4*	
		9841.9	56	0.0	$1/2^+$	D+Q	+0.65 *2*	
9852.3	(7/2)	3618.7	21.6	6233.4	$(7/2)^+$			
		3960.1	5.9	5892.1	$9/2^+$			
		5660.8	35	4191.01	$5/2^+$			
		6437.0	29	3414.58	$7/2^+$			
		6556.6	3.9	3294.90	$5/2^+$			
		7617.5	100	2233.63	$5/2^+$	D+Q	+0.27 *2*	
9865.8	7/2	3363.8	15.2	6501.3	$9/2^-$			
		4092.0	4.6	5772.7	$7/2^+$			
		4749.4	3.0	5115.2	$5/2^+$			
		5082.0	3.0	4784.7	$5/2^+$			
		5674.3	9.1	4191.01	$5/2^+$			
		6570.1	16.7	3294.90	$5/2^+$			
		7631.0	100	2233.63	$5/2^+$	D+Q	+0.01 *1*	
9867.8	$3/2^-$	4610.6	6.3	5256.8	$1/2^+$			
		4852	8.3	5015.2	$3/2^-$			
		5606.9	4.2	4260.4	$3/2^+$			
		5676.3	10.4	4191.01	$5/2^+$			
		6361.0	16.7	3506.1	$3/2^+$			
		6572.1	4.2	3294.90	$5/2^+$			
		6732.7	20.8	3134.3	$1/2^+$			
		7633.0	20.8	2233.63	$5/2^+$			
		8600.4	16.7	1266.08	$3/2^+$			
		9866.1	100	0.0	$1/2^+$	(E1(+M2))	+0.04 *1*	δ: other: −1.90 *2* also from (p,γ) giving a large M2 component is unlikely based on measured proton resonance strength and RUL.
9907.5		3296.9	2.6	6610.4	$3/2^-$			
		3673.9	2.6	6233.4	$(7/2)^+$			
		4015.3	2.6	5892.1	$9/2^+$			
		4133.7	18.4	5772.7	$7/2^+$			
		4892	21.1	5015.2	$3/2^-$			

$^{31}_{15}P_{16}$-76

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9907.5		5272.8	7.9	4633.58	$7/2^+$			
		6400.7	7.9	3506.1	$3/2^+$			
		6492.2	61	3414.58	$7/2^+$			
		6611.7	7.9	3294.90	$5/2^+$			
		6772.4	10.5	3134.3	$1/2^+$			
		7672.7	15.8	2233.63	$5/2^+$			
		8640.1	5.3	1266.08	$3/2^+$			
		9905.8	100	0.0	$1/2^+$	D+Q		δ: −0.02 *1* or −1.64 *2* from (p,γ).
9925.8	3/2	3331.3	31	6595.5	$(5/2)^-$			
		3544.8	39	6380.8	$(3/2)^+$			
		3937.6	23.1	5987.9	$(3/2)^+$			
		4366.6	15.4	5558.9	$3/2^+$			
		4809.4	31	5115.2	$5/2^+$			
		4910	46	5015.2	$3/2^-$			
		5141.9	46	4784.7	$5/2^+$			
		5332.8	46	4592.5	$3/2^+$			
		5494.1	46	4430.84	$7/2^-$			
		5664.8	69	4260.4	$3/2^+$			
		5734.3	69	4191.01	$5/2^+$			
		6419.0	15.4	3506.1	$3/2^+$			
		6510.5	39	3414.58	$7/2^+$			
		6630.0	31	3294.90	$5/2^+$			
		6790.7	39	3134.3	$1/2^+$			
		7691.0	69	2233.63	$5/2^+$			
		8658.4	15.4	1266.08	$3/2^+$			
		9924.1	100	0.0	$1/2^+$	D+Q	+0.60 *1*	
9941.3	$(3/2^-,5/2^+)$	4268.6	43	5672.4	5/2			
		4684.1	25.0	5256.8	$1/2^+$			
		5509.6	38	4430.84	$7/2^-$			
		6806.2	45	3134.3	$1/2^+$			
		7706.5	100	2233.63	$5/2^+$			
10019.7	$5/2^-$	3409.1	3.0	6610.4	$3/2^-$			
		4460.5	15.2	5558.9	$3/2^+$			
		4903.3	3.0	5115.2	$5/2^+$			
		5235.8	9.1	4784.7	$5/2^+$			
		5758.7	12.1	4260.4	$3/2^+$			
		6512.9	9.1	3506.1	$3/2^+$			
		6604.3	24.2	3414.58	$7/2^+$			
		6723.9	27	3294.90	$5/2^+$			
		7784.8	94	2233.63	$5/2^+$			
		8752.2	100	1266.08	$3/2^+$	(E1+M2)	−0.11 *2*	Mult.: D+Q from $\gamma(\theta)$; (E1+M2) from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.

$^{31}_{15}P_{16}$-77

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
10019.7	5/2$^-$	10018.0	6.1	0.0	1/2$^+$			
10037.0	(13/2$^+$)	2594.7[a] *6*	40[a] *20*	7442.1	11/2$^+$			
		3582.8[a] *7*	13[a] *5*	6453.49	11/2$^+$			
		4144.5[a] *7*	17[a] *5*	5892.1	9/2$^+$			
		4693.6[a] *8*	100[a] *20*	5342.84	9/2$^+$	Q		Mult.: Q from $\gamma\gamma$(ADO) in (^{16}O,2αpγ).
10046	5/2$^-$	3647.6	1.59	6399.0	7/2$^{(-)}$			
		5031	4.8	5014.9	(3/2$^+$)			
		5615.1	9.5	4430.84	7/2$^-$			
		5785.8	12.7	4260.4	3/2$^+$			
		6751.0	25	3294.90	5/2$^+$			
		7811.9	4.8	2233.63	5/2$^+$			
		8779.3	100	1266.08	3/2$^+$	(E1+M2)	−0.03 *2*	Mult.: D+Q from $\gamma(\theta)$; (E1+M2) from $\Delta\pi$, where parity assignments of connecting levels are uniquely established from independent arguments.
10075.8		4545.4	100	5530.0	(5/2)$^+$			
		6569.0	100	3506.1	3/2$^+$			
10089.4		4197.2	58	5892.1	9/2$^+$			
		5454.7	20	4633.58	7/2$^+$			
		5496.4	20	4592.5	3/2$^+$			
		6582.5	15	3506.1	3/2$^+$			
		6674.0	22.5	3414.58	7/2$^+$			
		8821.9	100	1266.08	3/2$^+$			
		10087.6	15	0.0	1/2$^+$			
10099.1		3718.1	28	6380.8	(3/2)$^+$			
		4110.9	4	5987.9	(3/2)$^+$			
		4206.9	8	5892.1	9/2$^+$			
		5084	32	5014.9	(3/2$^+$)			
		5315.2	52	4784.7	5/2$^+$			
		5506.1	40	4592.5	3/2$^+$			
		5667.3	44	4430.84	7/2$^-$			
		5838.1	4	4260.4	3/2$^+$			
		5907.6	4	4191.01	5/2$^+$			
		6592.2	4	3506.1	3/2$^+$			
		6683.7	8	3414.58	7/2$^+$			
		6803.3	20	3294.90	5/2$^+$			
		7864.2	100	2233.63	5/2$^+$			
		8831.6	40	1266.08	3/2$^+$			
		10097.3	12	0.0	1/2$^+$			
10144.5	(3/2$^+$,5/2)	3683.5	100	6460.8	5/2$^+$			
		5551.5	<20	4592.5	3/2$^+$			
		5953.0	40	4191.01	5/2$^+$			
		6729.1	76	3414.58	7/2$^+$			

$^{31}_{15}P_{16}$-78

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
10144.5	$(3/2^+,5/2)$	7909.6	96	2233.63	$5/2^+$				
		8877.0	76	1266.08	$3/2^+$				
		10142.7	12	0.0	$1/2^+$				
10193.0	$3/2^{(+)}$	4300.8[c]	1.52	5892.1	$9/2^+$	[M3]		0.000700 *10*	α(K)=4.08×10^{-6} *6*; α(L)=3.04×10^{-7} *4*; α(M)=2.309×10^{-8} *32* α(IPF)=0.000695 *10*
		4520.2	1.52	5672.4	5/2				
		4633.7	1.52	5558.9	$3/2^+$				
		4935.8	1.52	5256.8	$1/2^+$				
		5409.1	1.52	4784.7	$5/2^+$				
		5932.0	7.6	4260.4	$3/2^+$				
		6001.5	6.1	4191.01	$5/2^+$				
		6777.6	1.52	3414.58	$7/2^+$				
		6897.2	18.2	3294.90	$5/2^+$				
		7958.1	4.6	2233.63	$5/2^+$				
		8925.5	100	1266.08	$3/2^+$	D(+Q)	+0.02 *7*		
		10191.2	6.1	0.0	$1/2^+$				
10210.4	3/2	7975.5	80	2233.63	$5/2^+$				
		8942.9	100	1266.08	$3/2^+$	D+Q	−0.27 *3*		
		10208.6	20.0	0.0	$1/2^+$	D+Q	+0.11 *3*		
10212		7977	50	2233.63	$5/2^+$	D+Q	−0.05 *2*		
		8944	100	1266.08	$3/2^+$				
		10210	100	0.0	$1/2^+$				
10216.95	$(15/2)^-$	767.3[a] *2*	7.8[a] *15*	9449.86	$(13/2)^-$	[M1+E2]			If M1, B(M1)(W.u.)=0.025 *+11−7*. If E2, B(E2)(W.u.)=1.9×10^2 *+8−5*, exceeds RUL=100.
		903.9[a] *3*	5.5[a] *10*	9312.9	$(13/2^+)$	[E1]			B(E1)(W.u.)=0.00033 *+14−9*
		1041.7 *7*	39 *14*	9175.9	$(13/2)^-$	M1+E2	≥+0.30		B(M1)(W.u.)<0.088 B(E2)(W.u.)=8.0 to 392; upper bound exceeds RUL=100, implying δ(E2/M1)<0.15. E_γ: unweighted average of 1042.4 *2* from (^{20}Ne,pγ) and 1041.0 *2* from (^{16}O,2αpγ). I_γ: unweighted average of 52 *5* from (^{20}Ne,pγ) and 25 *5* from (^{16}O,2αpγ). Mult.,δ: D+Q from $\gamma\gamma$(ADO) in (^{16}O,2αpγ) with δ(Q/D)≥+0.30. E1+M2 is ruled out by RUL. RUL=100 for E2, gives δ(E2/M1)<0.15.
		1511.7 *5*	3.0 *13*	8705.23	$(13/2^-)$	[M1,E2]		9.4×10^{-5} *14*	α(K)=1.33×10^{-5} *12*; α(L)=9.9×10^{-7} *9*; α(M)=7.5×10^{-8} *7*

$^{31}_{15}P_{16}$-79

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									α(IPF)=8.0×10^{-5} *13* E_γ: weighted average of 1511.4 *6* from (^{12}C,αpγ) and 1511.9 *5* from (^{16}O,2αpγ). I_γ: weighted average of 1.3 *13* from (^{12}C,αpγ) and 4.0 *10* from (^{16}O,2αpγ). If M1, B(M1)(W.u.)=0.0012 *+8−5*. If E2, B(E2)(W.u.)=2.4 *+15−11*.
10216.95	(15/2)$^-$	1802.8[a] *5*	15.0[a] *25*	8414.2	11/2$^{(-)}$	[E2]		0.0002305 *32*	B(E2)(W.u.)=5.0 *+21−14* α(K)=1.022×10^{-5} *14*; α(L)=7.60×10^{-7} *11*; α(M)=5.78×10^{-8} *8* α(IPF)=0.0002195 *31*
		2139.6[a] *5*	13.5[a] *20*	8076.91	11/2$^{(-)}$	[E2]		0.000391 *5*	B(E2)(W.u.)=1.9 *+8−5* α(K)=7.46×10^{-6} *10*; α(L)=5.55×10^{-7} *8*; α(M)=4.22×10^{-8} *6* α(IPF)=0.000383 *5*
		2356.8[a] *6*	20[a] *5*	7859.6	11/2$^{(-)}$	[E2]		0.000496 *7*	B(E2)(W.u.)=1.7 *+8−6* α(K)=6.31×10^{-6} *9*; α(L)=4.69×10^{-7} *7*; α(M)=3.56×10^{-8} *5* α(IPF)=0.000489 *7*
		3392.8 *6*	100 *8*	6823.91	11/2$^-$	E2		0.000951 *13*	B(E2)(W.u.)=1.4 *+6−3* α(K)=3.51×10^{-6} *5*; α(L)=2.61×10^{-7} *4*; α(M)=1.984×10^{-8} *28* α(IPF)=0.000948 *13* E_γ: weighted average of 3392.3 *7* from (^{20}Ne,pγ), 3394.8 *11* from (^{12}C,αpγ), and 3392.5 *6* from (^{16}O,2αpγ). I_γ: from (^{20}Ne,pγ). Others: 100 *20* from (^{12}C,αpγ) and 100 *23* from (^{16}O,2αpγ). Mult.: Q from γγ(ADO) in (^{16}O,2αpγ); M2 ruled out by RUL. Other: D+Q in (^{20}Ne,pγ) is inconsistent.
10226	7/2	4695	5.9	5530.0	(5/2)$^+$				
		5441	7.8	4784.7	5/2$^+$				
		5793	9.8	4430.84	7/2$^-$				
		6033	19.6	4191.01	5/2$^+$				
		7990	100	2233.63	5/2$^+$	D+Q	+0.04 *2*		
		8957	53	1266.08	3/2$^+$				
		10223	9.8	0.0	1/2$^+$	[E3,M3]			
10233	5/2	7997	80	2233.63	5/2$^+$				
		8964	100	1266.08	3/2$^+$	D(+Q)	−0.05 *6*		
		10230	20.0	0.0	1/2$^+$				
10267	3/2	8032	100	2233.63	5/2$^+$				

$^{31}_{15}P_{16}$-80

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
10267	3/2	8999	80	1266.08	$3/2^+$	D(+Q)	−0.04 *9*	
		10265	20	0.0	$1/2^+$			
10271	3/2	8036	100	2233.63	$5/2^+$			
		9003	50	1266.08	$3/2^+$	D+Q	−0.12 *2*	
		10269	16.7	0.0	$1/2^+$			
10287	5/2	8052	100	2233.63	$5/2^+$	D(+Q)	−0.02 *4*	
		9019	29	1266.08	$3/2^+$			
		10285	14.3	0.0	$1/2^+$	Q		
10304	3/2	8068	100	2233.63	$5/2^+$	D+Q	−0.65 *18*	
		9035	50	1266.08	$3/2^+$			
		10301	16.7	0.0	$1/2^+$	D+Q	+0.23 *5*	
10335	3/2	8099	100	2233.63	$5/2^+$			
		9066	29	1266.08	$3/2^+$			
		10332	14.3	0.0	$1/2^+$	D+Q	+0.18 *3*	
10385	5/2	8149	100	2233.63	$5/2^+$	D+Q	+0.40 *14*	
		9116	50	1266.08	$3/2^+$			
		10382	16.7	0.0	$1/2^+$			
10401	5/2	8165	100	2233.63	$5/2^+$	D+Q	+0.23 *18*	
		9132	50	1266.08	$3/2^+$			
		10398	16.7	0.0	$1/2^+$			
10425	(1/2,3/2)	8189	75	2233.63	$5/2^+$	(D+Q)		
		9156	75	1266.08	$3/2^+$			
		10422	100	0.0	$1/2^+$	D+Q		
10455		8219	100	2233.63	$5/2^+$			
		9186	67	1266.08	$3/2^+$			
10483	5/2	8247	100	2233.63	$5/2^+$			
		9214	43	1266.08	$3/2^+$	D+Q	−0.42 *25*	
10485	3/2	8249	60	2233.63	$5/2^+$			
		9216	100	1266.08	$3/2^+$			
		10482	40	0.0	$1/2^+$	D+Q	+0.19 *1*	
10487	3/2	8251	75	2233.63	$5/2^+$			
		9218	75	1266.08	$3/2^+$			
		10484	100	0.0	$1/2^+$	D(+Q)	+0.02 *3*	
10503		8267	100	2233.63	$5/2^+$			
		9234	50	1266.08	$3/2^+$			
		10500	16.7	0.0	$1/2^+$			
10520.16	$(15/2^+)$	483.1[a] *2*	5.0[a] *12*	10037.0	$(13/2^+)$	[M1+E2]		If M1, B(M1)(W.u.)=0.0082 *+23−21*. If E2, B(E2)(W.u.)=156 *+43−39*, exceeds RUL=100 for E2.
		920.4[a] *3*	7.6[a] *17*	9599.8	$(13/2^+)$	[M1,E2]		If M1, B(M1)(W.u.)=0.00180 *+48−45*. If E2, B(E2)(W.u.)=9.5 *+25−24*.
		1070.1 *4*	50 *7*	9449.86	$(13/2)^-$	[E1]		B(E1)(W.u.)=2.35×10^{-4} *+40−35*

$^{31}_{15}P_{16}$-81

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
									E_γ: weighted average of 1070.7 *4* from (^{20}Ne,pγ) and 1069.8 *3* from (^{16}O,2αpγ).
									I_γ: unweighted average of 57 *5* from (^{20}Ne,pγ) and 43 *5* from (^{16}O,2αpγ).
10520.16	(15/2$^+$)	1207.3[a] *4*	6.0[a] *19*	9312.9	(13/2$^+$)	[M1,E2]		3.1×10^{-5} *5*	α(K)=2.08×10^{-5} *28*; α(L)=1.55×10^{-6} *21*; α(M)=1.17×10^{-7} *16* α(IPF)=8.8×10^{-6} *18* If M1, B(M1)(W.u.)=0.00063 *+22−20*. If E2, B(E2)(W.u.)=1.9 *+7−6*.
		1344.3[a] *5*	2.1[a] *7*	9175.9	(13/2)$^-$	[E1]		0.0001651 *23*	B(E1)(W.u.)=5.0×10^{-6} *+19−17* α(K)=9.44×10^{-6} *13*; α(L)=7.02×10^{-7} *10*; α(M)=5.34×10^{-8} *7* α(IPF)=0.0001549 *22*
		1815.2 *7*	100 *10*	8705.23	(13/2$^-$)	(E1)		0.000516 *7*	B(E1)(W.u.)=9.6×10^{-5} *+13−11* α(K)=5.86×10^{-6} *8*; α(L)=4.36×10^{-7} *6*; α(M)=3.31×10^{-8} *5* α(IPF)=0.000509 *7*
									E_γ: unweighted average of 1815.9 *4* from (^{20}Ne,pγ) and 1814.5 *4* from (^{16}O,2αpγ). I_γ: from (^{20}Ne,pγ). Mult.: D with ΔJ=1 from γγ(DCO) in (^{20}Ne,pγ) and (^{16}O,2αpγ); (E1) from level scheme.
		2176.4[a] *6*	2.1[a] *5*	8343.5	(11/2$^+$)	[E2]		0.000409 *6*	B(E2)(W.u.)=0.035 *+10−9* α(K)=7.24×10^{-6} *10*; α(L)=5.39×10^{-7} *8*; α(M)=4.09×10^{-8} *6* α(IPF)=0.000401 *6*
		3078.1[a] *6*	4.3[a] *7*	7442.1	11/2$^+$	[E2]		0.000823 *12*	B(E2)(W.u.)=0.0128 *+29−25* α(K)=4.08×10^{-6} *6*; α(L)=3.03×10^{-7} *4*; α(M)=2.305×10^{-8} *32* α(IPF)=0.000818 *11*
		4066[ac]	<1.43[a]	6453.49	11/2$^+$	[E2]		1.20×10^{-3} *2*	B(E2)(W.u.)<0.0014 α(K)=2.69×10^{-6} *4*; α(L)=1.998×10^{-7} *28*; α(M)=1.519×10^{-8} *21* α(IPF)=0.001193 *17*
10537	3/2	8302	40	2233.63	5/2$^+$				
		9269	60	1266.08	3/2$^+$				
		10535	100	0.0	1/2$^+$	D+Q	−0.07 *3*		
10564	3/2	8329	75	2233.63	5/2$^+$				
		9296	100	1266.08	3/2$^+$				

$^{31}_{15}P_{16}$-82

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
10564	3/2	10562	75	0.0	$1/2^+$	D+Q	+0.63 *9*	
10607	3/2	8372	100	2233.63	$5/2^+$			
		9339	50	1266.08	$3/2^+$			
		10605	16.7	0.0	$1/2^+$	D+Q	+0.35 *3*	
10620		8385	100	2233.63	$5/2^+$			
		9352	80	1266.08	$3/2^+$			
		10618	20	0.0	$1/2^+$			
10629		8394	100	2233.63	$5/2^+$			
		9361	50	1266.08	$3/2^+$			
		10627	16.7	0.0	$1/2^+$			
10645	3/2	8410	100	2233.63	$5/2^+$			
		9377	100	1266.08	$3/2^+$			
		10643	50	0.0	$1/2^+$	D+Q	−0.18 *5*	
10650	3/2	8415	50	2233.63	$5/2^+$			
		9382	100	1266.08	$3/2^+$	D+Q	+0.08 *5*	
		10648	16.7	0.0	$1/2^+$			
10659	3/2	8424	100	2233.63	$5/2^+$			
		9391	100	1266.08	$3/2^+$			
		10657	50	0.0	$1/2^+$	D+Q	−1.04 *9*	
10672	5/2	8437	100	2233.63	$5/2^+$			
		9404	80	1266.08	$3/2^+$	D+Q	+0.06 *5*	
		10670	20.0	0.0	$1/2^+$			
10698	3/2	8463	40	2233.63	$5/2^+$			
		9430	100	1266.08	$3/2^+$			
		10696	60	0.0	$1/2^+$	D+Q	+0.02 *1*	
10703	3/2	8468	40	2233.63	$5/2^+$			
		9435	100	1266.08	$3/2^+$			
		10701	60	0.0	$1/2^+$	D+Q	+0.09 *1*	
10706	3/2	8471	75	2233.63	$5/2^+$			
		9438	100	1266.08	$3/2^+$			
		10704	75	0.0	$1/2^+$	D+Q	−0.27 *5*	
10717		8482	80	2233.63	$5/2^+$			
		9449	100	1266.08	$3/2^+$			
		10715	20.0	0.0	$1/2^+$			
10758		8523	100	2233.63	$5/2^+$			
		9490	67	1266.08	$3/2^+$			
10759.4	$(15/2^-)$	3934.6[a] *7*	100	6823.91	$11/2^-$	Q		Mult.: Q from (^{16}O,2αpγ), ΔJ=2 from $\gamma\gamma$(ADO); E2 from level scheme.
10774	3/2	8539	75	2233.63	$5/2^+$			
		9506	100	1266.08	$3/2^+$			
		10772	75	0.0	$1/2^+$	D(+Q)	+0.01 *1*	
10792		8557	100	2233.63	$5/2^+$			
10801	3/2	8566	100	2233.63	$5/2^+$			

$^{31}_{15}P_{16}$-83

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]
10801	3/2	9533	75	1266.08	$3/2^+$		
		10799	75	0.0	$1/2^+$	D+Q	+0.05 *1*
10818	3/2	8583	50	2233.63	$5/2^+$		
		9550	100	1266.08	$3/2^+$	D+Q	−0.34 *8*
		10816	100	0.0	$1/2^+$	D+Q	+0.27 *2*
10834	3/2	8599	100	2233.63	$5/2^+$		
		9566	100	1266.08	$3/2^+$		
		10832	50	0.0	$1/2^+$	D+Q	+0.33 *3*
10846	(1/2,3/2)	8611	100	2233.63	$5/2^+$		
		9578	80	1266.08	$3/2^+$		
		10844	20.0	0.0	$1/2^+$		
10857		8622	100	2233.63	$5/2^+$		
		9589	67	1266.08	$3/2^+$		
10882	3/2	8647	100	2233.63	$5/2^+$		
		9614	80	1266.08	$3/2^+$		
		10880	20	0.0	$1/2^+$	D+Q	+0.63 *7*
10907		8672	100	2233.63	$5/2^+$		
		9639	80	1266.08	$3/2^+$		
		10905	20	0.0	$1/2^+$		
10936		8701	100	2233.63	$5/2^+$		
		9668	75	1266.08	$3/2^+$		
		10934	75	0.0	$1/2^+$		
10948	3/2	8713	75	2233.63	$5/2^+$		
		9680	75	1266.08	$3/2^+$		
		10946	100	0.0	$1/2^+$	D+Q	+0.11 *2*
10980		8745	100	2233.63	$5/2^+$		
		9712	33	1266.08	$3/2^+$		
		10978	33	0.0	$1/2^+$		
11075	3/2	8840	75	2233.63	$5/2^+$		
		9807	75	1266.08	$3/2^+$		
		11073	100	0.0	$1/2^+$	D+Q	−0.14 *1*
11080		8845	100	2233.63	$5/2^+$		
		9812	75	1266.08	$3/2^+$		
		11078	75	0.0	$1/2^+$		
11119		8884	100	2233.63	$5/2^+$		
		9851	60	1266.08	$3/2^+$		
		11117	40	0.0	$1/2^+$		
11135	3/2	8900	100	2233.63	$5/2^+$		
		9867	100	1266.08	$3/2^+$		
		11133	50	0.0	$1/2^+$	D+Q	+0.51 *2*
11152		8917	100	2233.63	$5/2^+$		
		9884	14.3	1266.08	$3/2^+$		

$^{31}_{15}P_{16}$-84

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
11152		11150	29	0.0	1/2$^+$				
11173	5/2	8937	100	2233.63	5/2$^+$				
		9904	100	1266.08	3/2$^+$	D+Q	+0.042 *7*		
		11170	50	0.0	1/2$^+$				
11296.98	(17/2$^+$)	537.5[a] *2*	12.7[a] *27*	10759.4	(15/2$^-$)	[E1]			B(E1)(W.u.)=1.89×10^{-4} *+50−44*
		776.8[a] *2*	100[a] *13*	10520.16	(15/2$^+$)	M1+E2	+0.17 *10*		B(M1)(W.u.)=0.0154 *22*; B(E2)(W.u.)=3.3 *+46−27* E_γ,I_γ: other: 776.7 *3* with Iγ=100 *17* from (^{20}Ne,pγ). Mult.,δ: D+Q with ΔJ=1 from γγ(ADO) in (^{16}O,2αpγ); E1+M2 ruled out by RUL.
		1080.3 *3*	66 *10*	10216.95	(15/2)$^-$	[E1]			B(E1)(W.u.)=1.21×10^{-4} *+21−19* E_γ: weighted average of 1080.9 *6* from (^{20}Ne,pγ) and 1080.1 *3* from (^{16}O,2αpγ). I_γ: weighted average of 73 *10* from (^{20}Ne,pγ) and 53 *13* from (^{16}O,2αpγ).
		1259.6[a] *4*	40[a] *5*	10037.0	(13/2$^+$)	[E2]		4.33×10^{-5} *6*	B(E2)(W.u.)=4.2 *+8−7* α(K)=2.136×10^{-5} *30*; α(L)=1.591×10^{-6} *22*; α(M)=1.209×10^{-7} *17* α(IPF)=2.024×10^{-5} *30*
		1697[ac]	<2.0[a]	9599.8	(13/2$^+$)	[E2]		0.0001840 *26*	B(E2)(W.u.)<0.061 α(K)=1.148×10^{-5} *16*; α(L)=8.54×10^{-7} *12*; α(M)=6.49×10^{-8} *9* α(IPF)=0.0001716 *24*
		1984[ac]	<2.0[a]	9312.9	(13/2$^+$)	[E2]		0.000316 *4*	B(E2)(W.u.)<0.028 α(K)=8.55×10^{-6} *12*; α(L)=6.36×10^{-7} *9*; α(M)=4.83×10^{-8} *7* α(IPF)=0.000306 *4*
		4472.7[a] *9*	4.0[a] *13*	6823.91	11/2$^-$	[E3]		1.03×10^{-3} *1*	B(E3)(W.u.)=8.0 *+30−27* α(K)=3.01×10^{-6} *4*; α(L)=2.241×10^{-7} *31*; α(M)=1.703×10^{-8} *24* α(IPF)=0.001031 *14*
11733.8	(15/2$^+$)	1516.8[a] *5*	100[a] *19*	10216.95	(15/2)$^-$	D			Mult.: D from ΔJ=0 from γγ(ADO) in (^{16}O,2αpγ); Δπ=yes from level scheme.
		2557.7[a] *9*	50[a] *13*	9175.9	(13/2)$^-$				
		3028.5[a] *9*	88[a] *19*	8705.23	(13/2$^-$)				
		5280.3[a] *19*	44[a] *6*	6453.49	11/2$^+$	Q			Mult.: Q from ΔJ=2 from γγ(ADO) in (^{16}O,2αpγ); E2 from level scheme.
11873		8457	100	3414.58	7/2$^+$				

$^{31}_{15}P_{16}$-85

Adopted Levels, Gammas (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π
11929	3/2	7145	83	4784.7	$5/2^+$
		7737	50	4191.01	$5/2^+$
		8513	100	3414.58	$7/2^+$
		8633	100	3294.90	$5/2^+$
12078		4959	12.5	7117.7	$9/2^+$
		5998	12.5	6078.53	$9/2^+$
		8661	100	3414.58	$7/2^+$
12155		5037	20	7117.7	$9/2^+$
		5702	100	6453.49	$11/2^+$
		6810	70	5342.84	$9/2^+$
		8739	10	3414.58	$7/2^+$
12170.6		2994.6& *24*	100	9175.9	$(13/2)^-$
12204	$11/2^-$	3858	75	8345.5	$(7/2^-,9/2^+)$
		4738	50	7466	$(7/2)^-$
		5375	100	6828	$(7/2^-,9/2^+)$
		5411	50	6796.0	$9/2^-$
		5751	75	6453.49	$11/2^+$
		6125	75	6078.53	$9/2^+$
		6311	50	5892.1	$9/2^+$
		7772	25	4430.84	$7/2^-$
12221.8		5103.7	33	7117.7	$9/2^+$
		5289	16.7	6931.4	$5/2^+$
		6329	16.7	5892.1	$9/2^+$
		6448	33	5772.7	$7/2^+$
		6692	33	5530.0	$(5/2)^+$
		6877	50	5342.84	$9/2^+$
		7586.7	33	4633.58	$7/2^+$
		7789.6	16.7	4430.84	$7/2^-$
		8806.0	100	3414.58	$7/2^+$
12235	$(5/2^+,7/2,9/2^+)$	5118	75	7117.7	$9/2^+$
		6157	25	6078.53	$9/2^+$
		6343	25	5892.1	$9/2^+$
		6462	100	5772.7	$7/2^+$
		6891	100	5342.84	$9/2^+$
		7601	50	4633.58	$7/2^+$
		7804	25	4430.84	$7/2^-$
		8820	75	3414.58	$7/2^+$
		10000	25	2233.63	$5/2^+$
12311		3965	57	8345.5	$(7/2^-,9/2^+)$
		4869	100	7442.1	$11/2^+$
		5193	14.3	7117.7	$9/2^+$
12311		5858	43	6453.49	$11/2^+$
		6418	43	5892.1	$9/2^+$
		7879	14.3	4430.84	$7/2^-$
		8895	14.3	3414.58	$7/2^+$
12329	$5/2^-$	5396	40	6931.4	$5/2^+$
		5500	80	6828	$(7/2^-,9/2^+)$
		6799	80	5530.0	$(5/2)^+$
		7694	60	4633.58	$7/2^+$
		7897	100	4430.84	$7/2^-$
		10093	40	2233.63	$5/2^+$
12380	(5/2 to 11/2)	6301	16.7	6078.53	$9/2^+$
		7035	25	5342.84	$9/2^+$
		7948	25	4430.84	$7/2^-$
		8964	100	3414.58	$7/2^+$
12386		8970	100	3414.58	$7/2^+$
12420		6341	60	6078.53	$9/2^+$
		6527	20	5892.1	$9/2^+$
		6646	60	5772.7	$7/2^+$
		7636	100	4784.7	$5/2^+$
		7785	40	4633.58	$7/2^+$
		9004	40	3414.58	$7/2^+$
		10184	80	2233.63	$5/2^+$
12447	$7/2^-$	9031	100	3414.58	$7/2^+$
		9151	11.1	3294.90	$5/2^+$
12458		5525	25	6931.4	$5/2^+$
		7674	25	4784.7	$5/2^+$
		7823	50	4633.58	$7/2^+$
		8026	50	4430.84	$7/2^-$
		9042	100	3414.58	$7/2^+$
12481		6028	20	6453.49	$11/2^+$
		6588	40	5892.1	$9/2^+$
		7136	100	5342.84	$9/2^+$
		9065	40	3414.58	$7/2^+$
12496		5056	23.1	7442.1	$11/2^+$
		6045	7.7	6453.49	$11/2^+$
		6605	15.4	5892.1	$9/2^+$
		6968	7.7	5530.0	$(5/2)^+$
		7153	100	5342.84	$9/2^+$
12549		5107	100	7442.1	$11/2^+$
		5720	86	6828	$(7/2^-,9/2^+)$
		6096	86	6453.49	$11/2^+$

$^{31}_{15}P_{16}$-86

Adopted Levels, Gammas (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π
12549		7914	14.3	4633.58	$7/2^+$
13879.2	$(19/2^+)$	2582.1[a] *9*	100	11296.98	$(17/2^+)$

† Additional information 191.

‡ Except where noted, values are from ^{30}Si(p,γ) up to E=11173 keV, and beyond E=11173 level, values are from (α,γ):resonance, unless otherwise noted. Gamma branchings from levels above 10200 keV are considered as incomplete by the evaluators.

From ^{30}Si(p,γ) based on $\gamma(\theta)$ and $\gamma\gamma(\theta)$ data with magnetic/electric nature determined by measured γ(lin pol) and/or by RUL based on measured lifetimes, unless otherwise noted. Where no lifetimes and γ(lin pol) data available, M or E characters are implied from parities of initial and final levels if known and are placed inside parentheses.

@ From p$\gamma(\theta)$ in (α,pγ) with magnetic/electric nature determined by measured γ(lin pol) and/or by RUL based on measured lifetimes.

& From (^{20}Ne,pγ).

a From (^{16}O,2αpγ).

b From (α,γ):resonances.

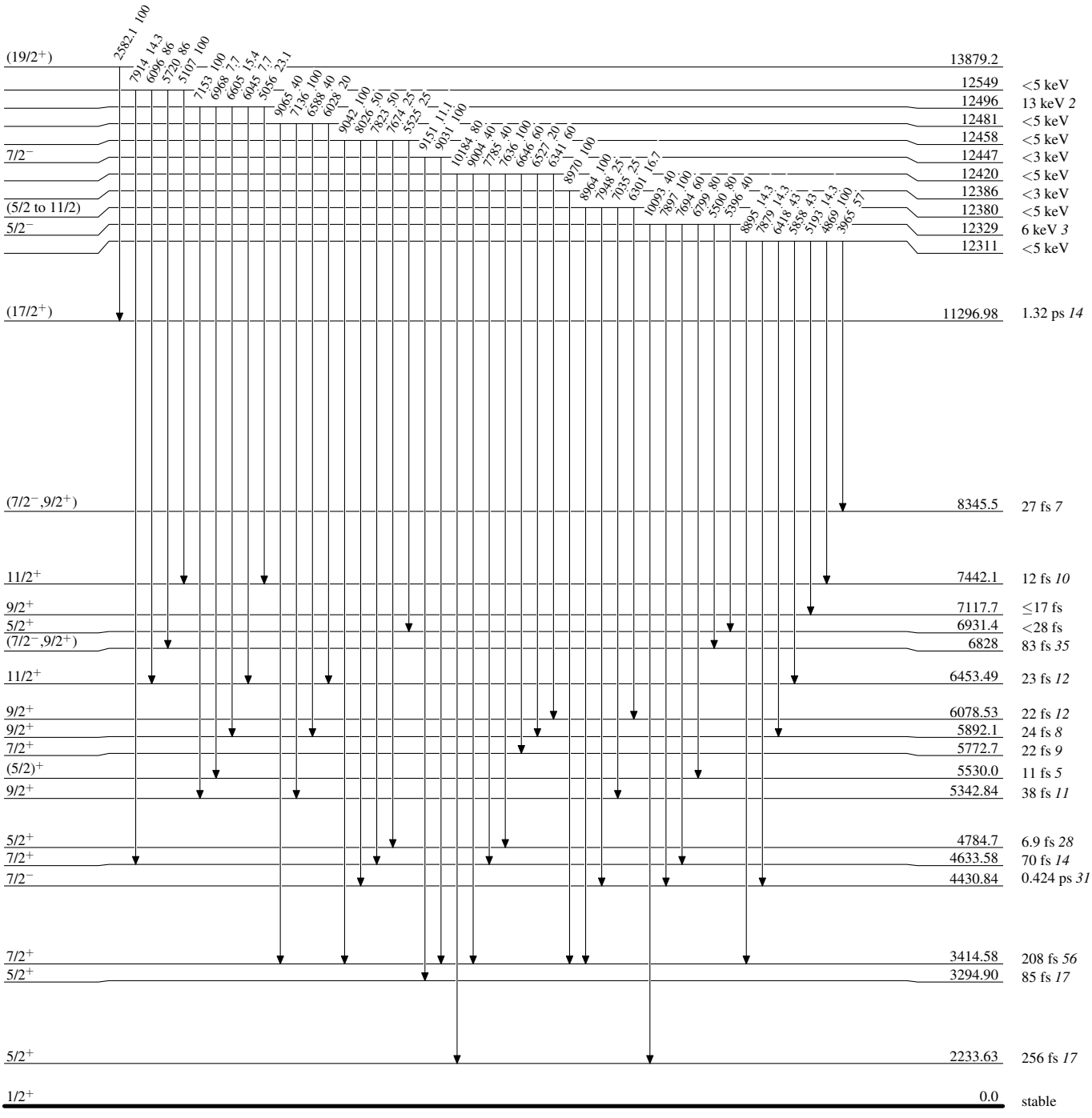
c Placement of transition in the level scheme is uncertain.

$^{31}_{15}P_{16}$-87

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

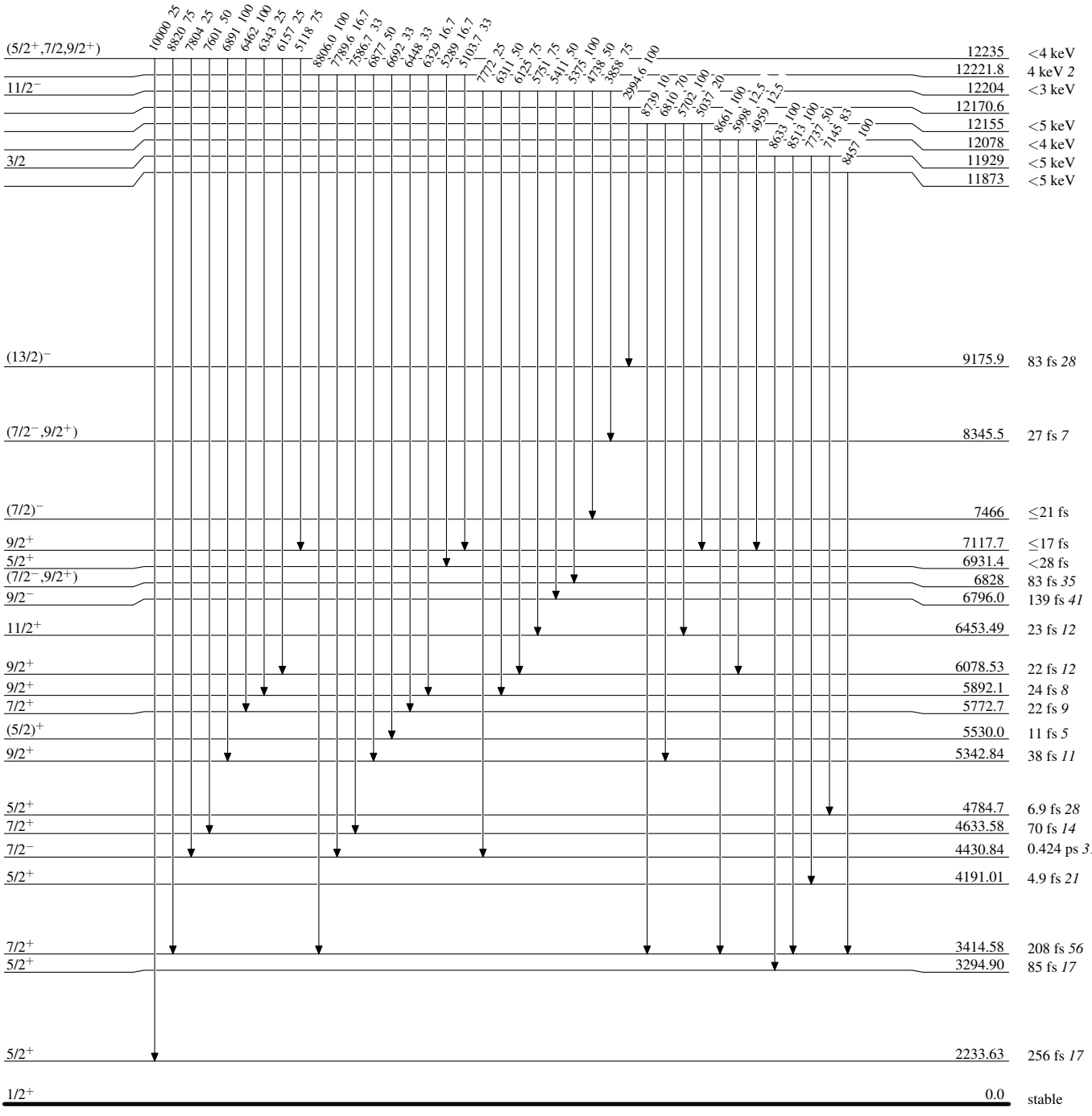


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{31}_{15}P_{16}$

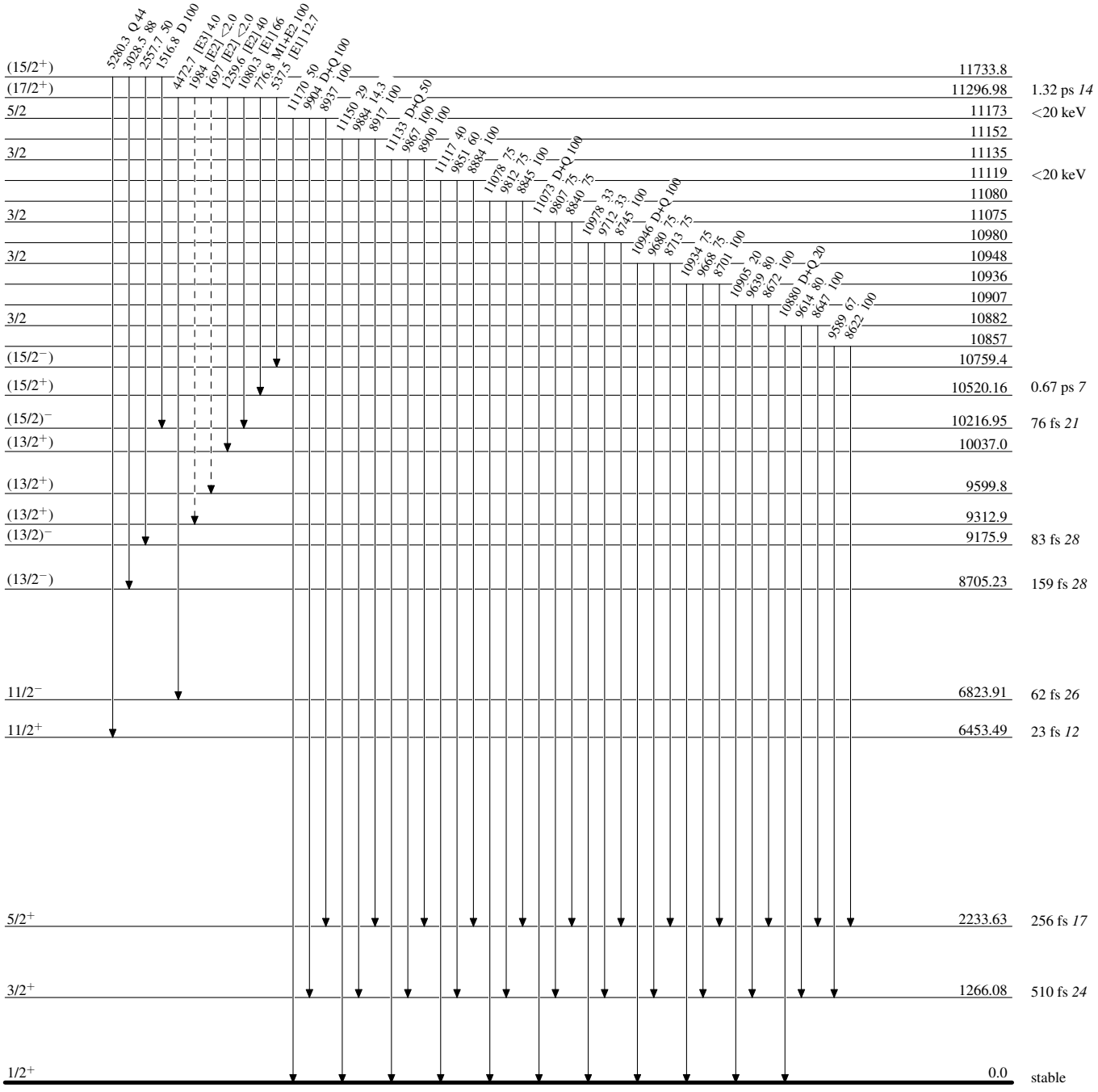
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)

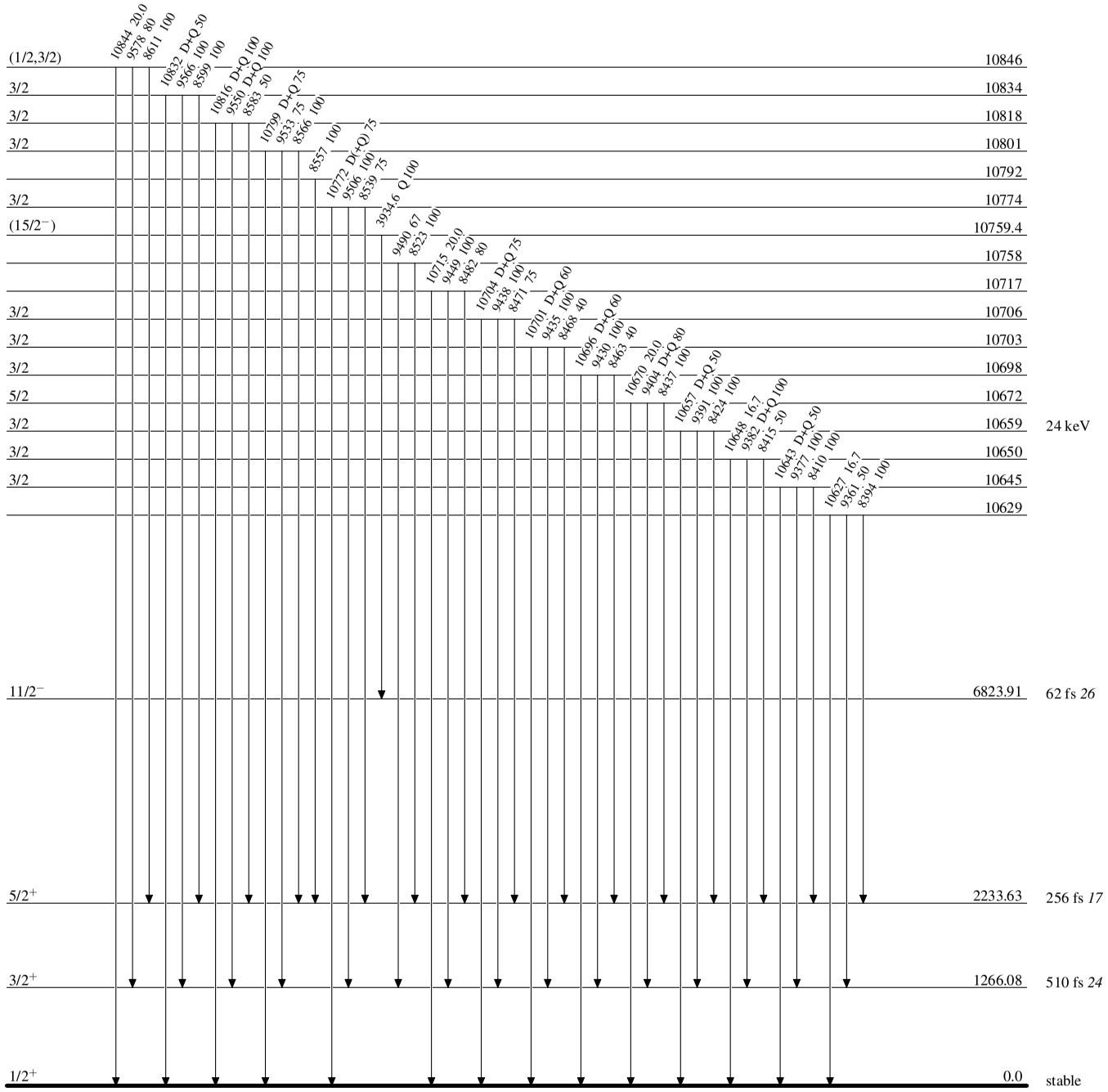


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{31}_{15}P_{16}$

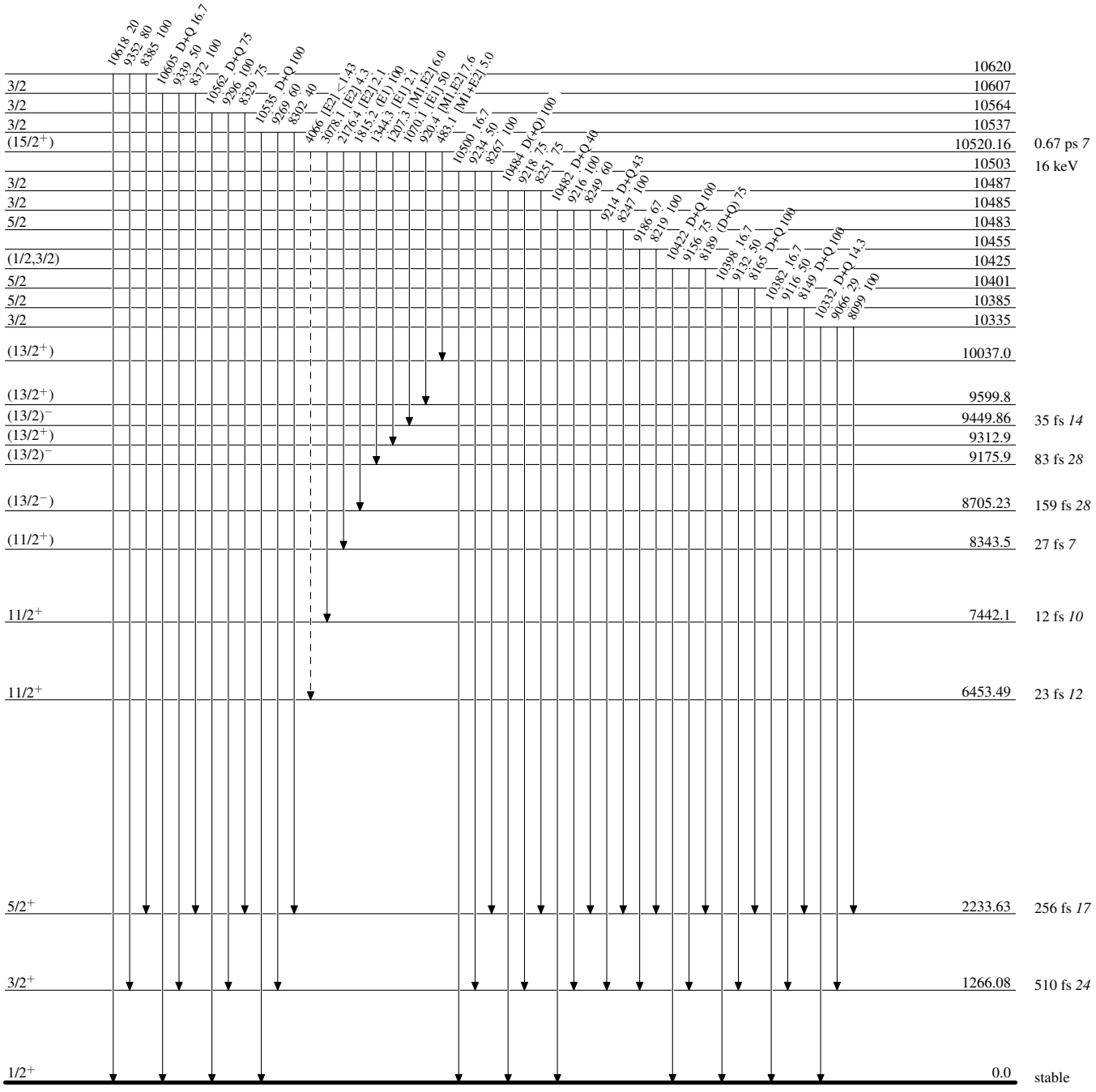
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

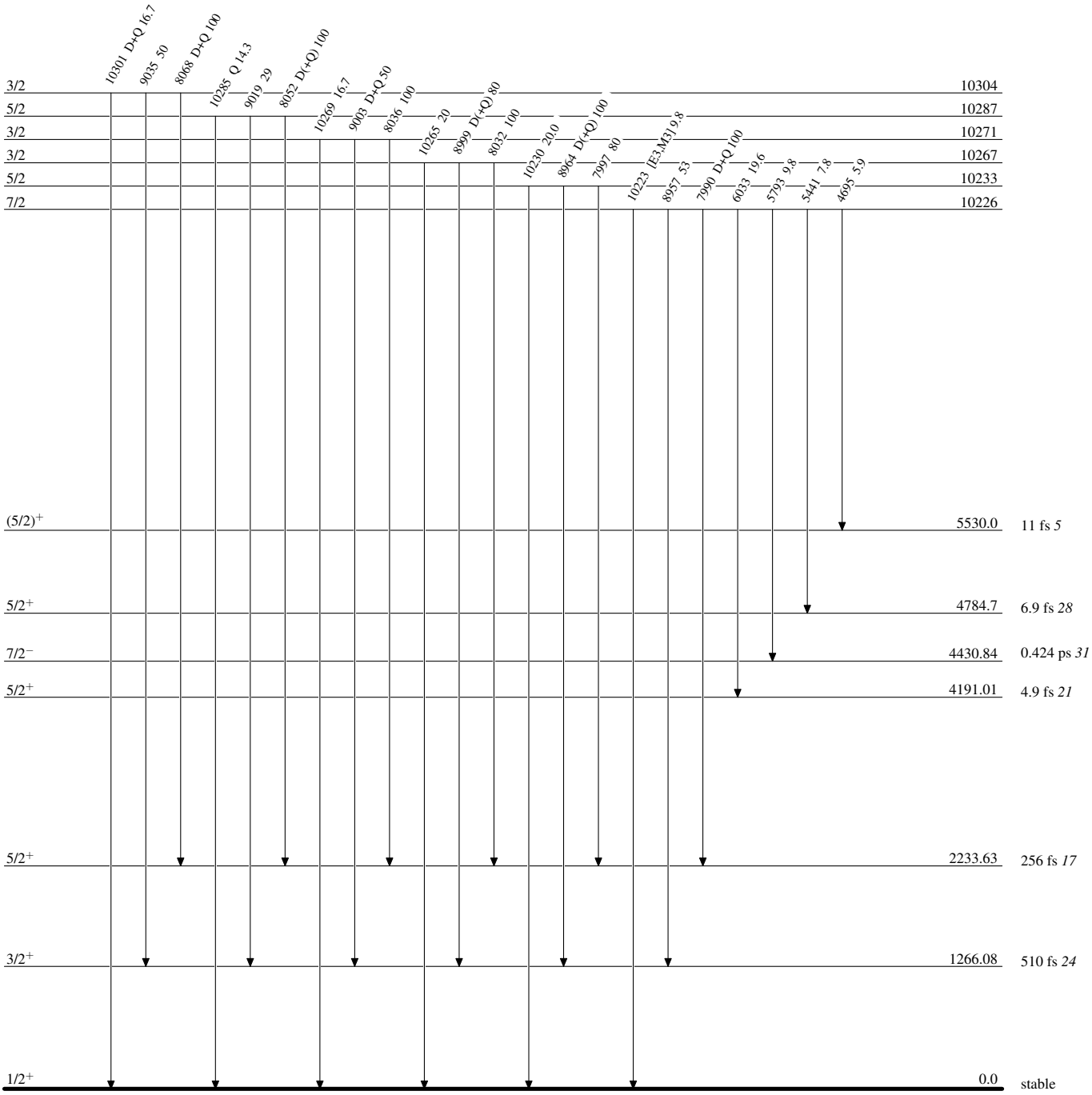


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



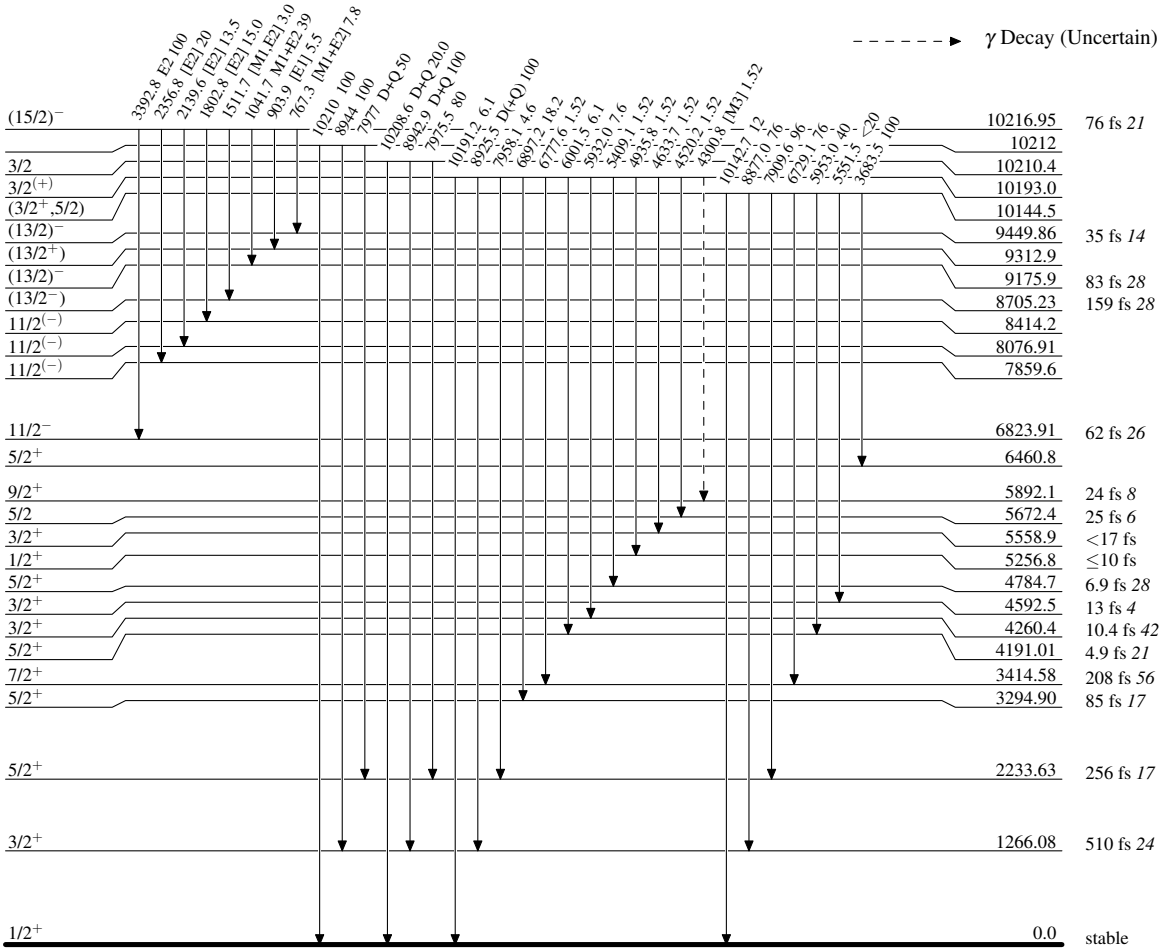
$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

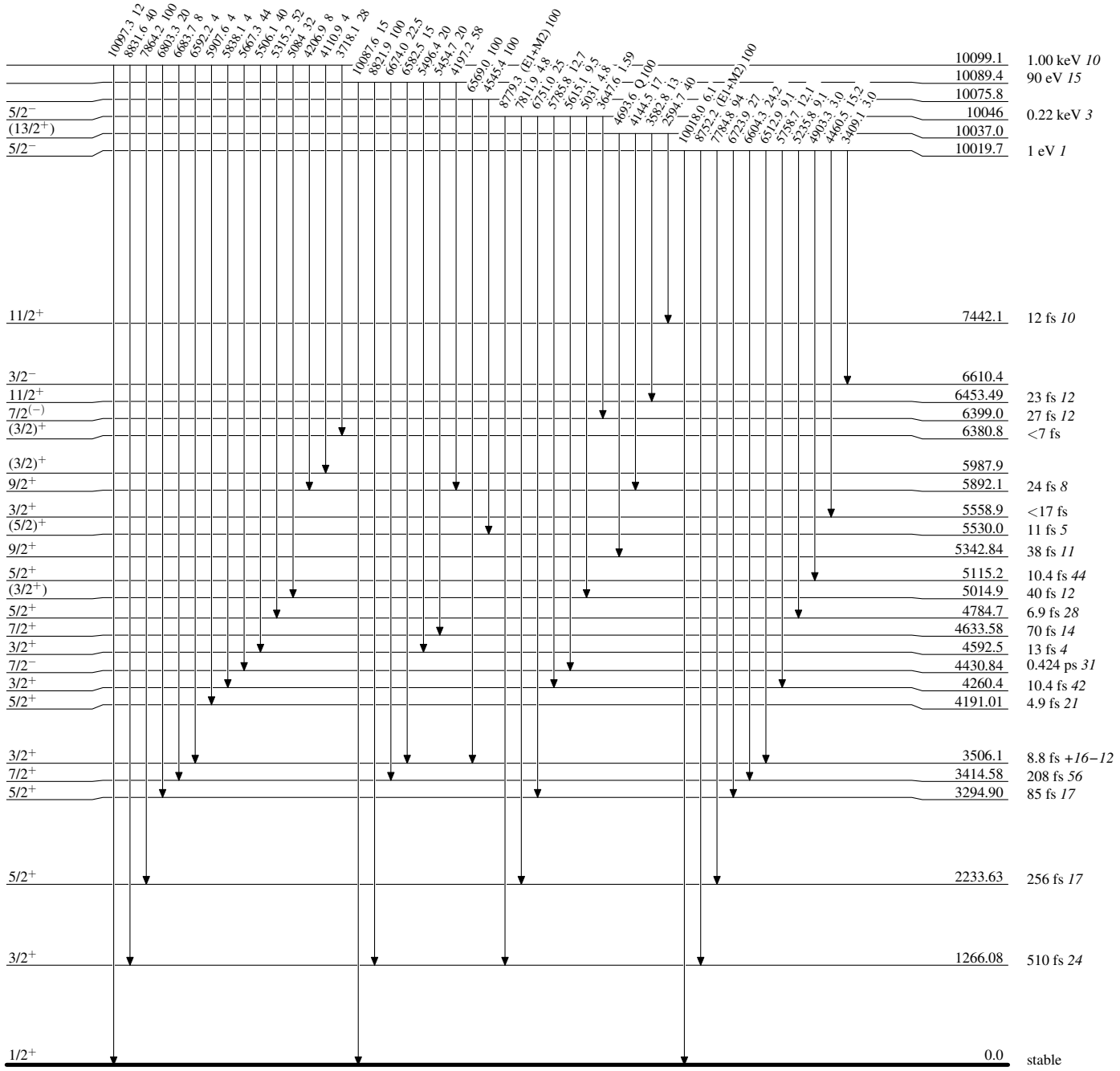


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

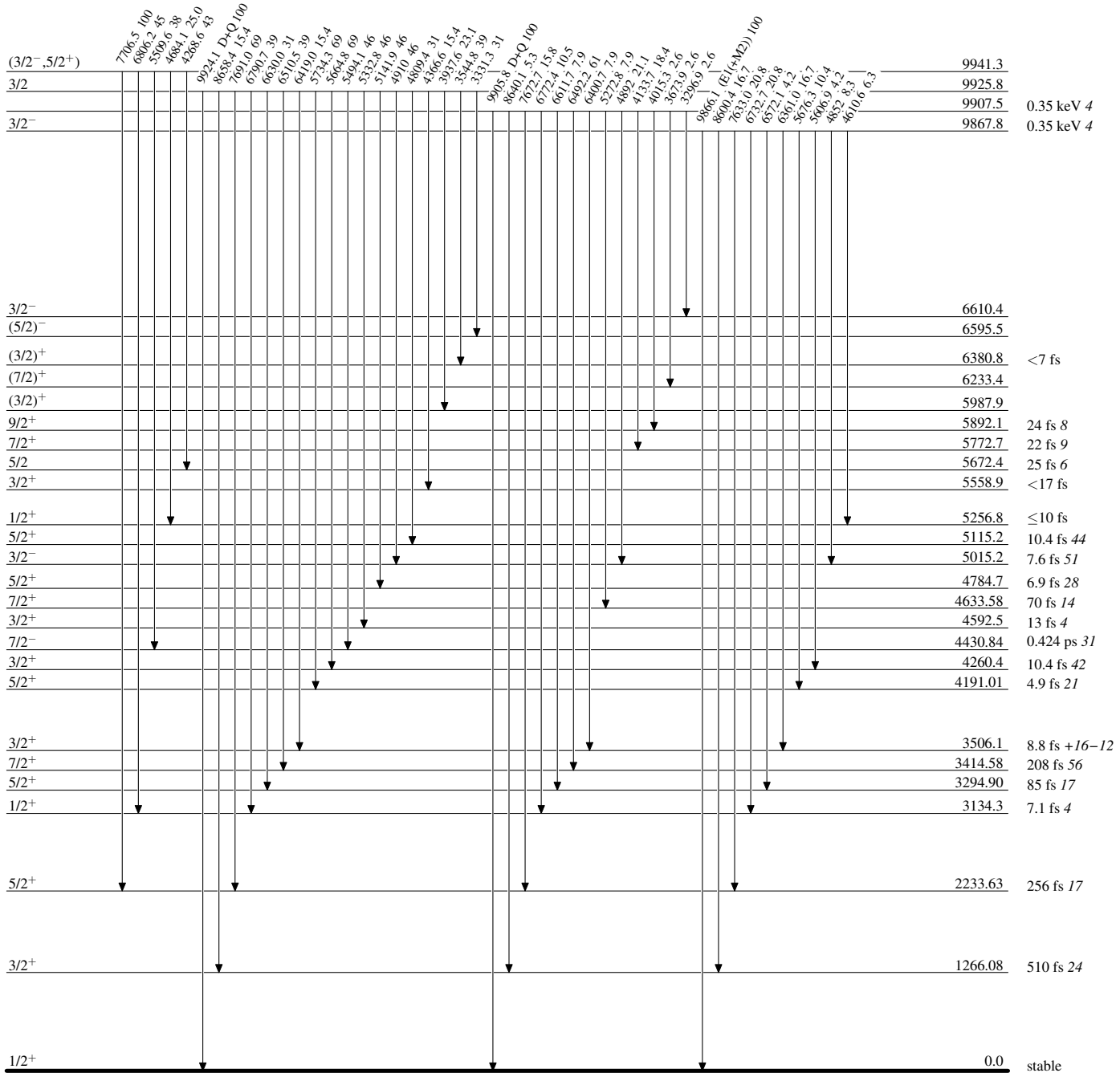


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

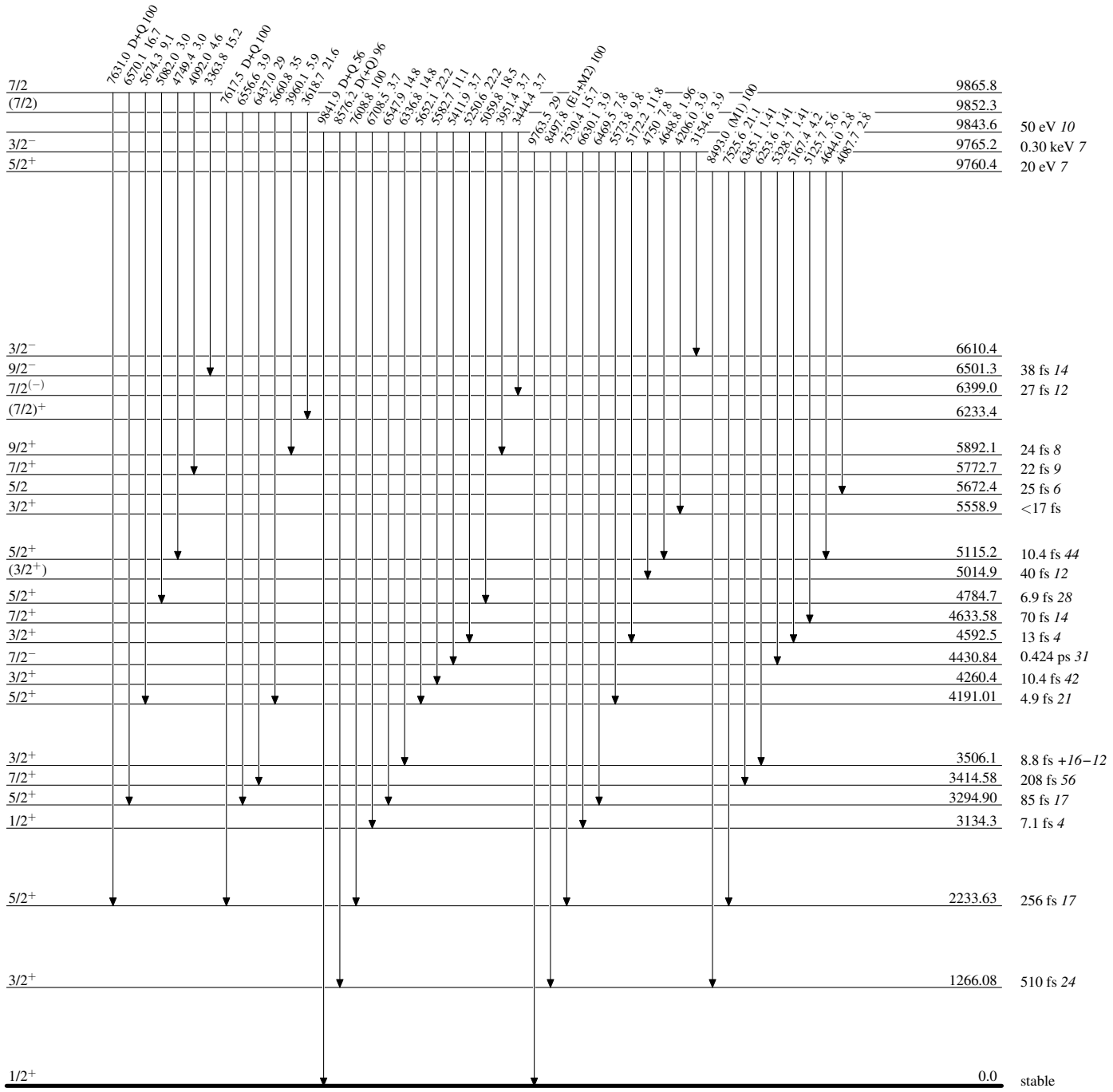


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

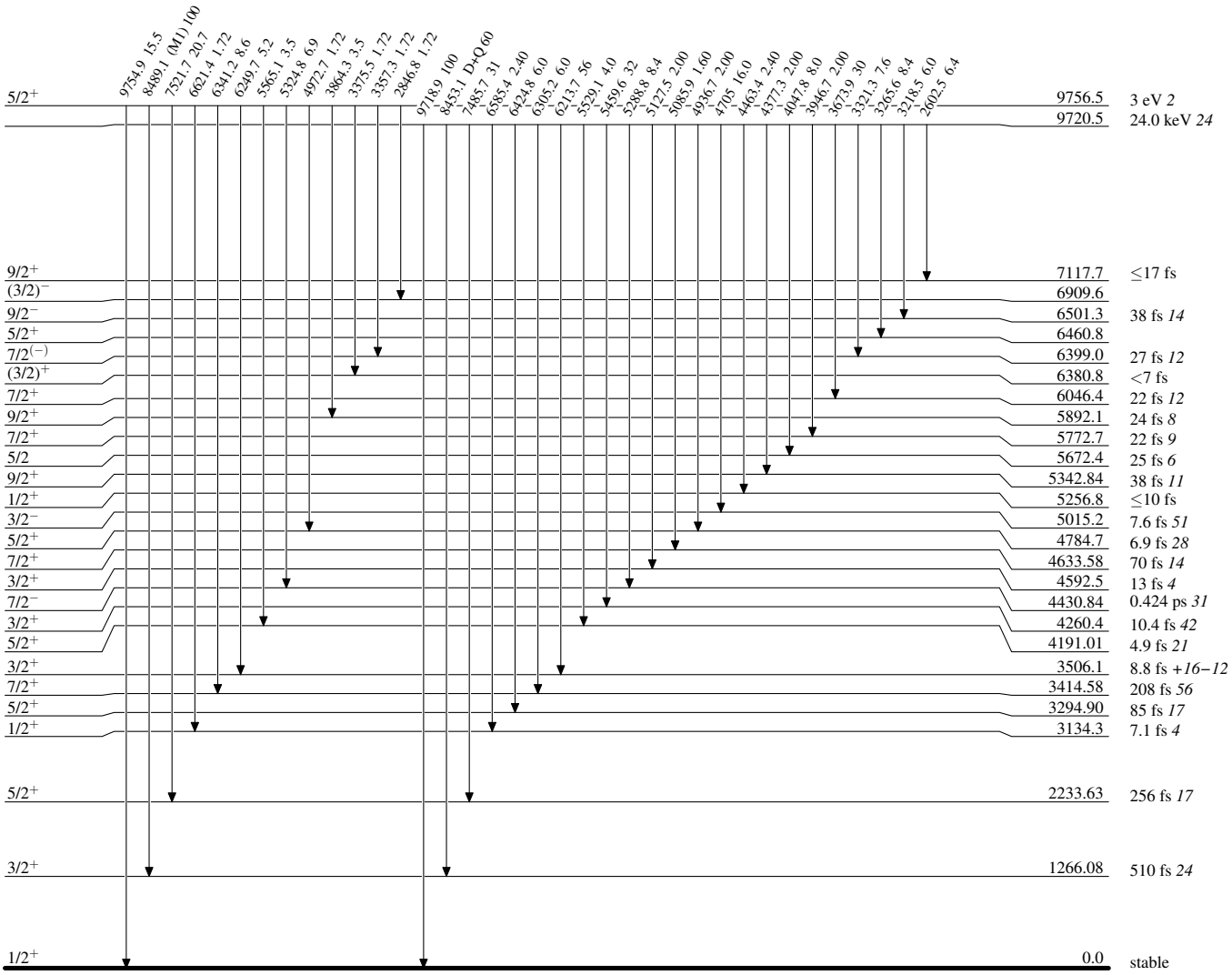


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

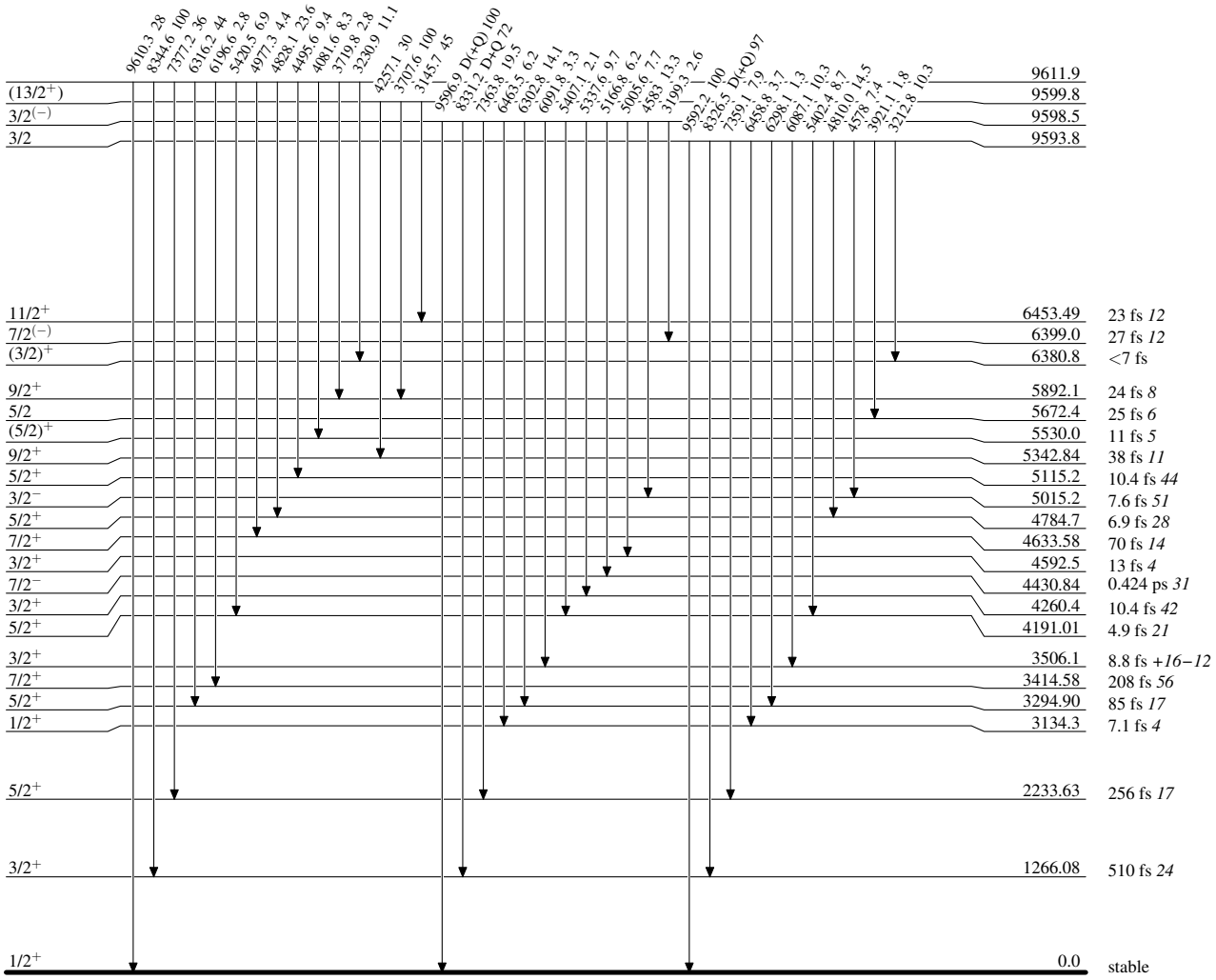


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

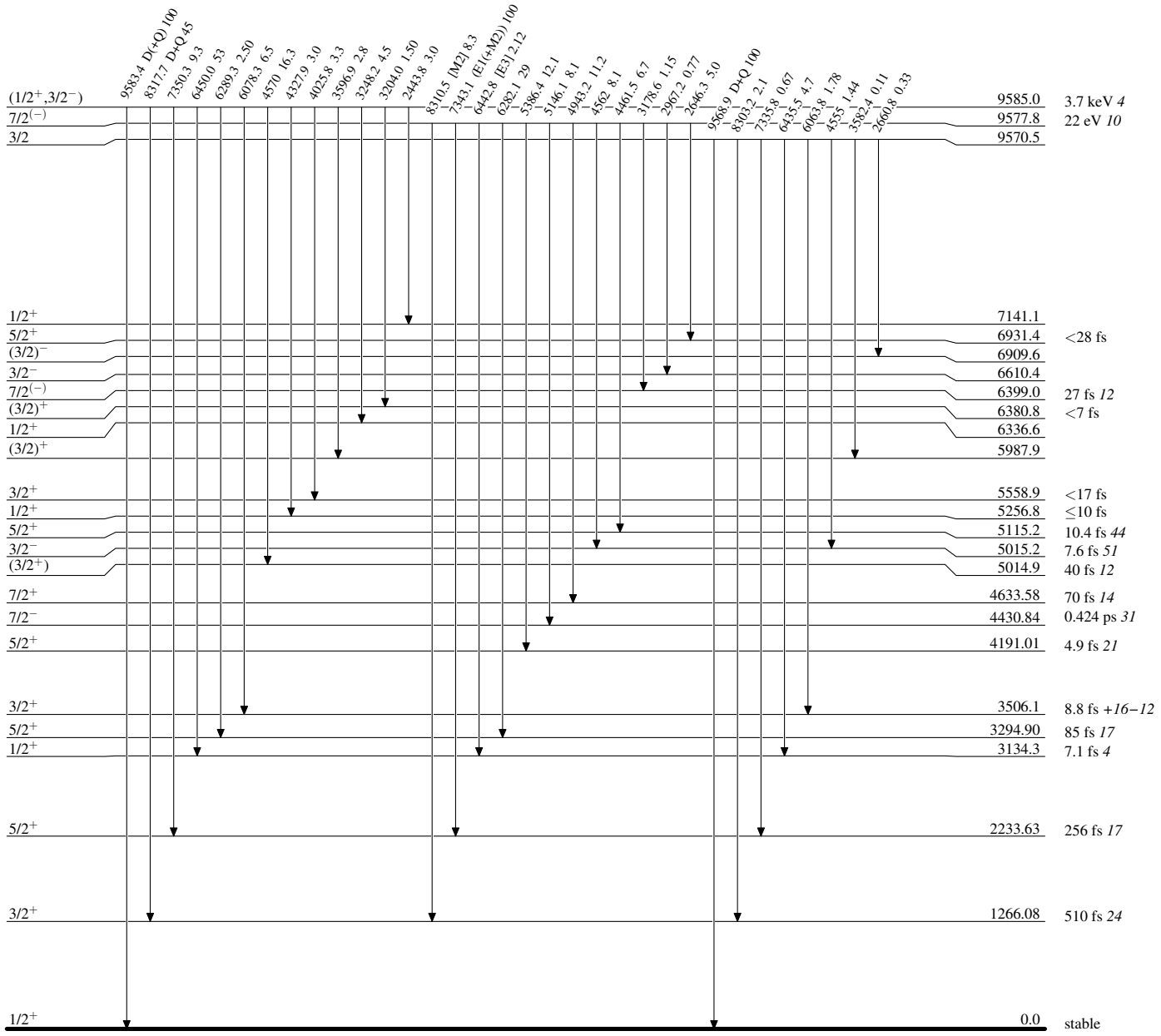


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



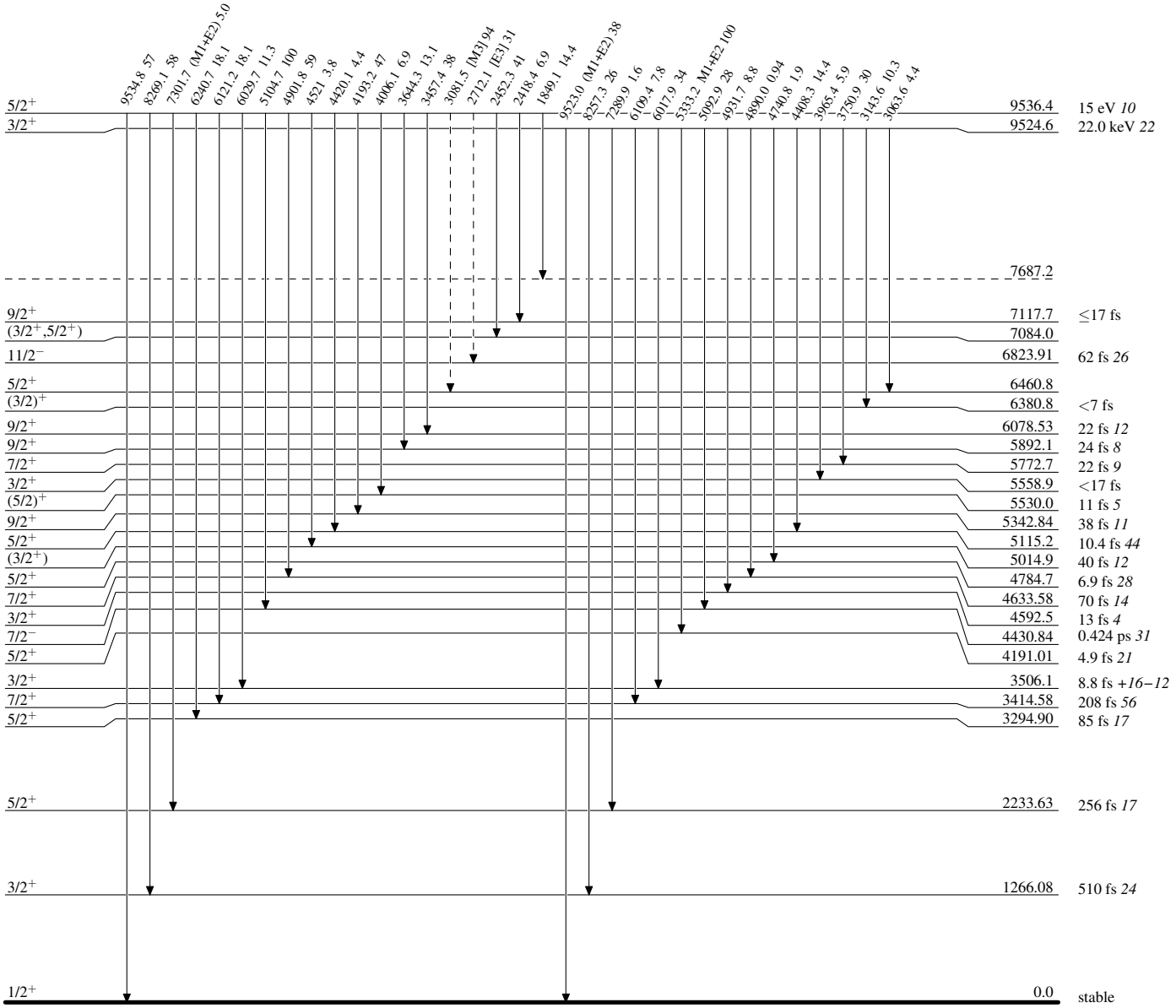
$^{31}_{15}P_{16}$

Adopted Levels, Gammas Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

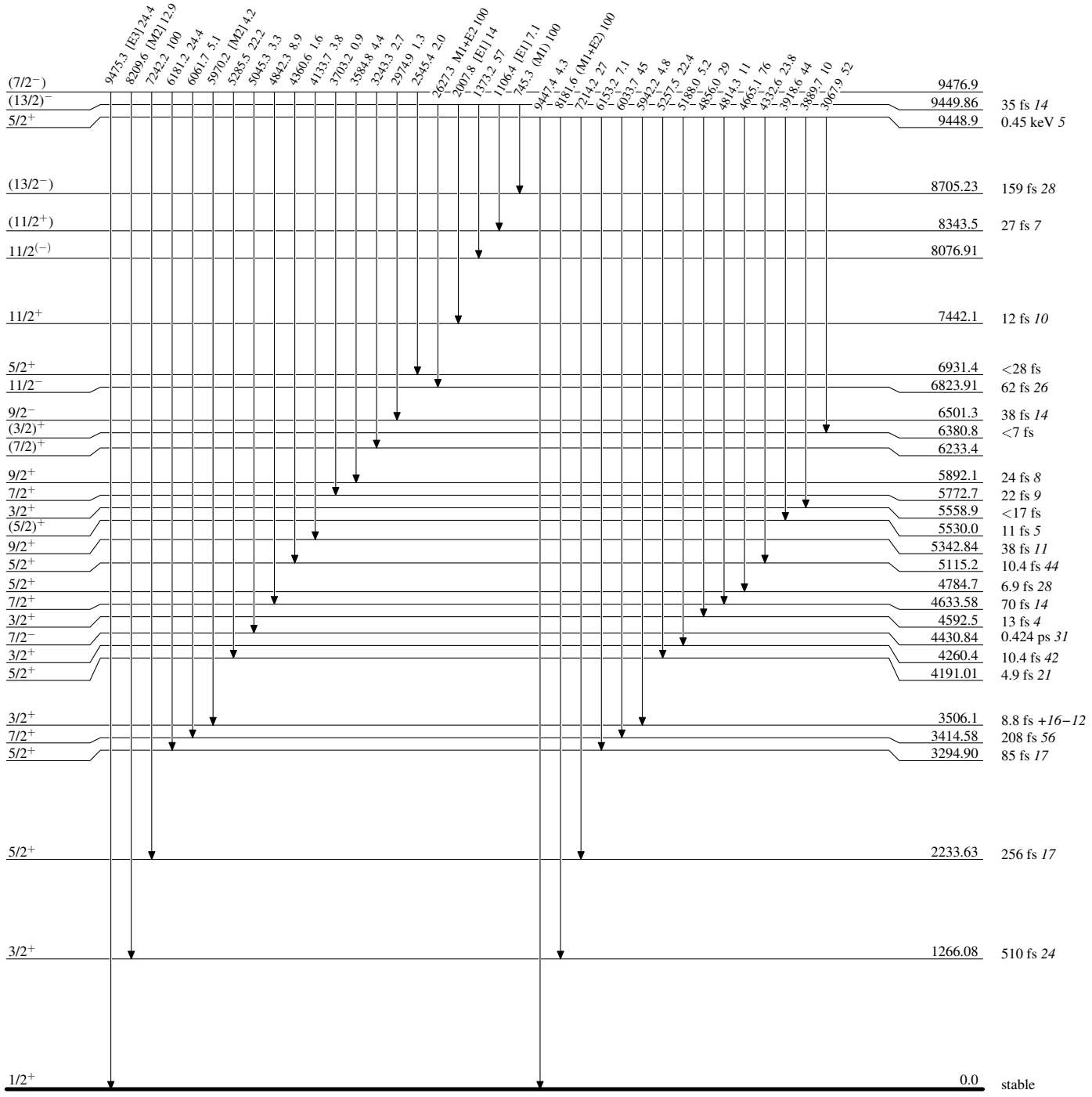


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

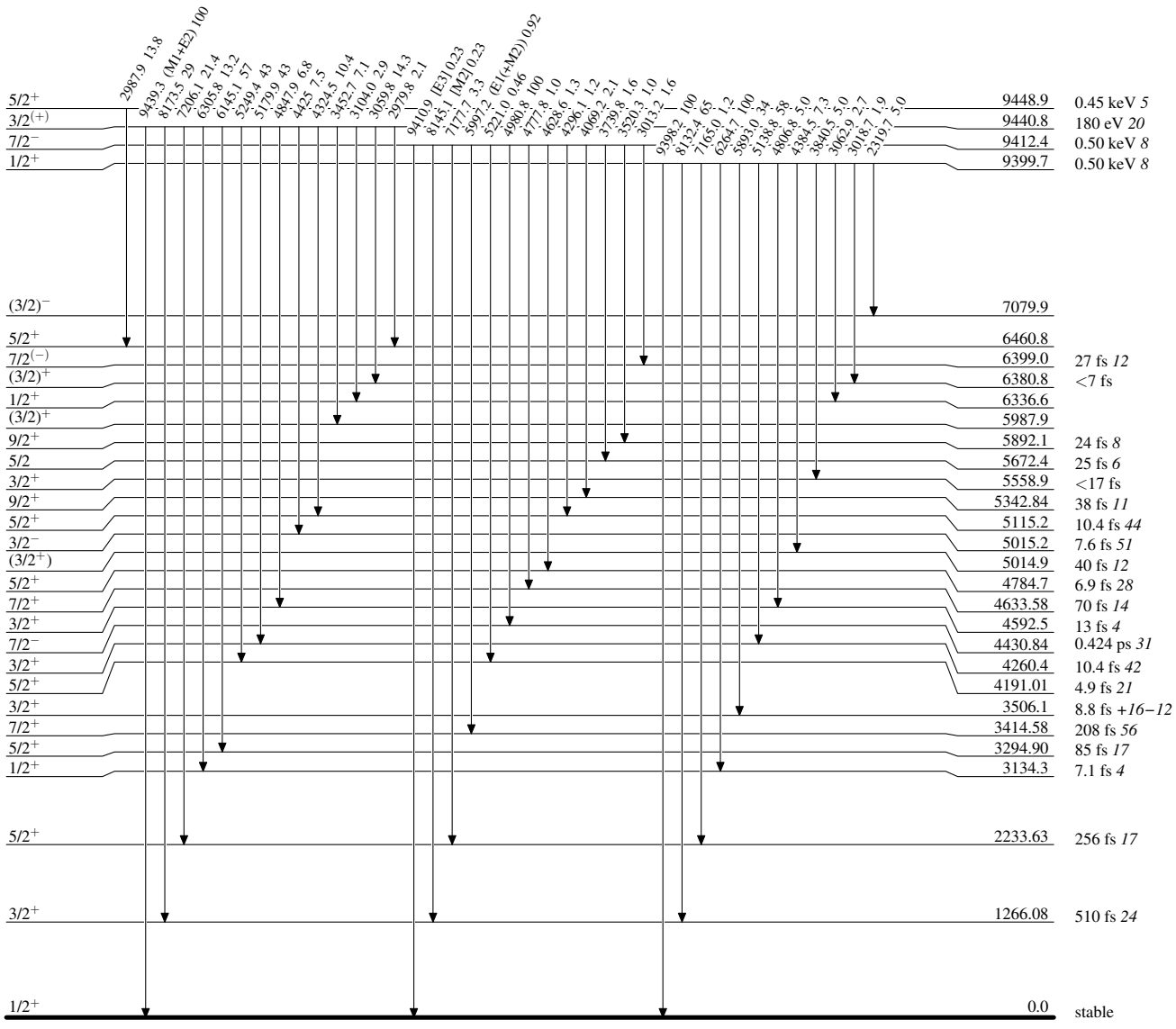


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

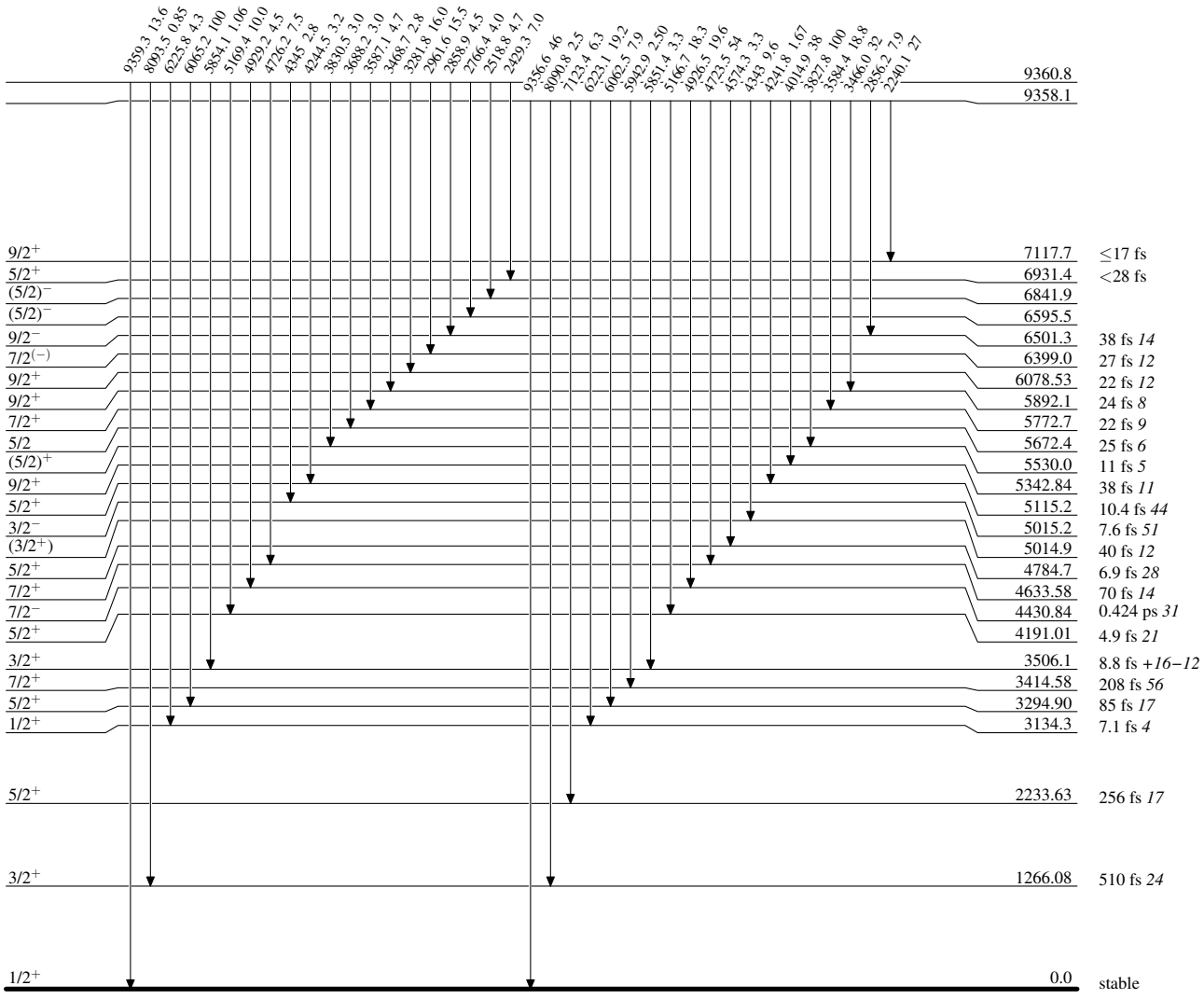


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

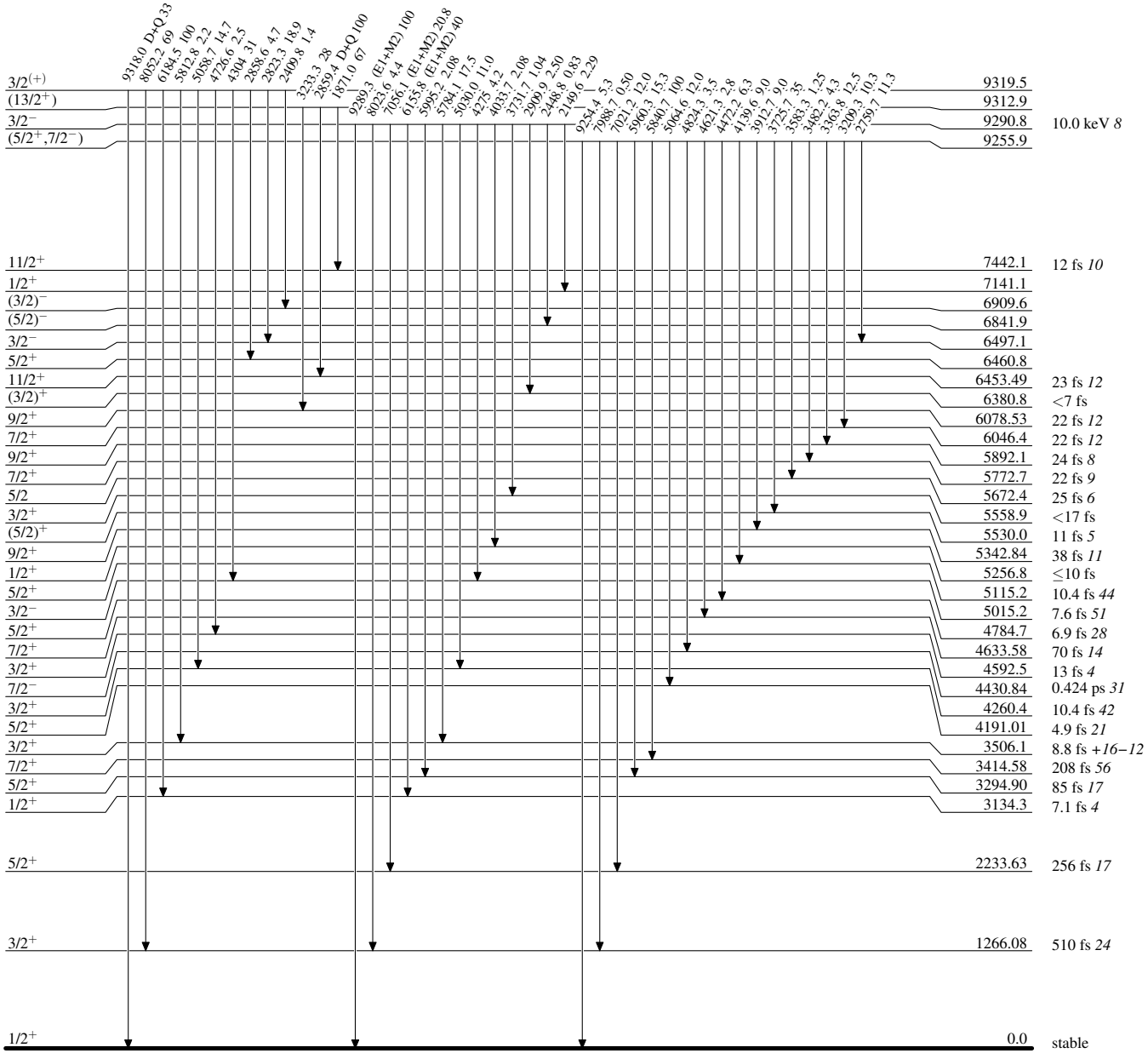


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

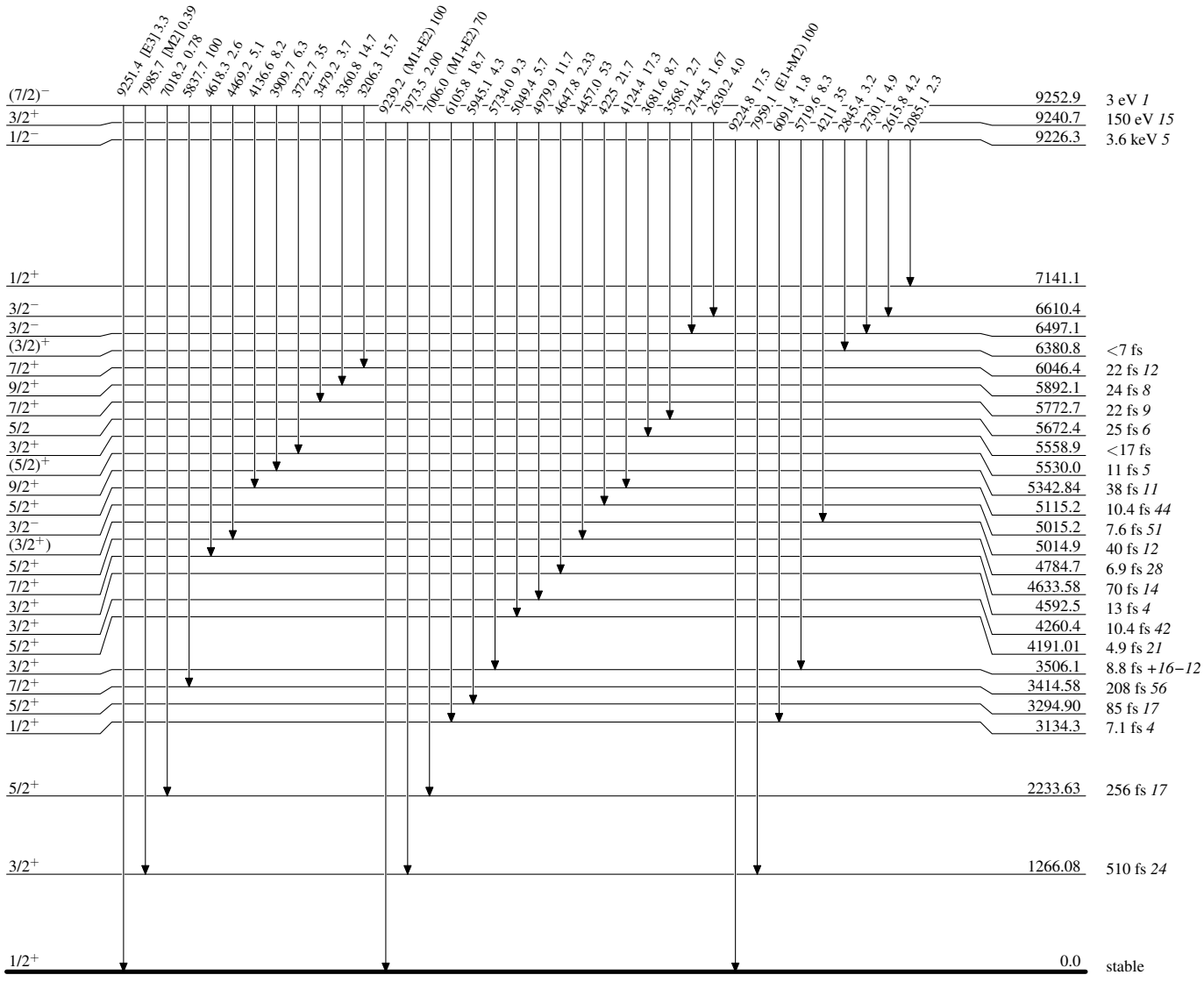


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

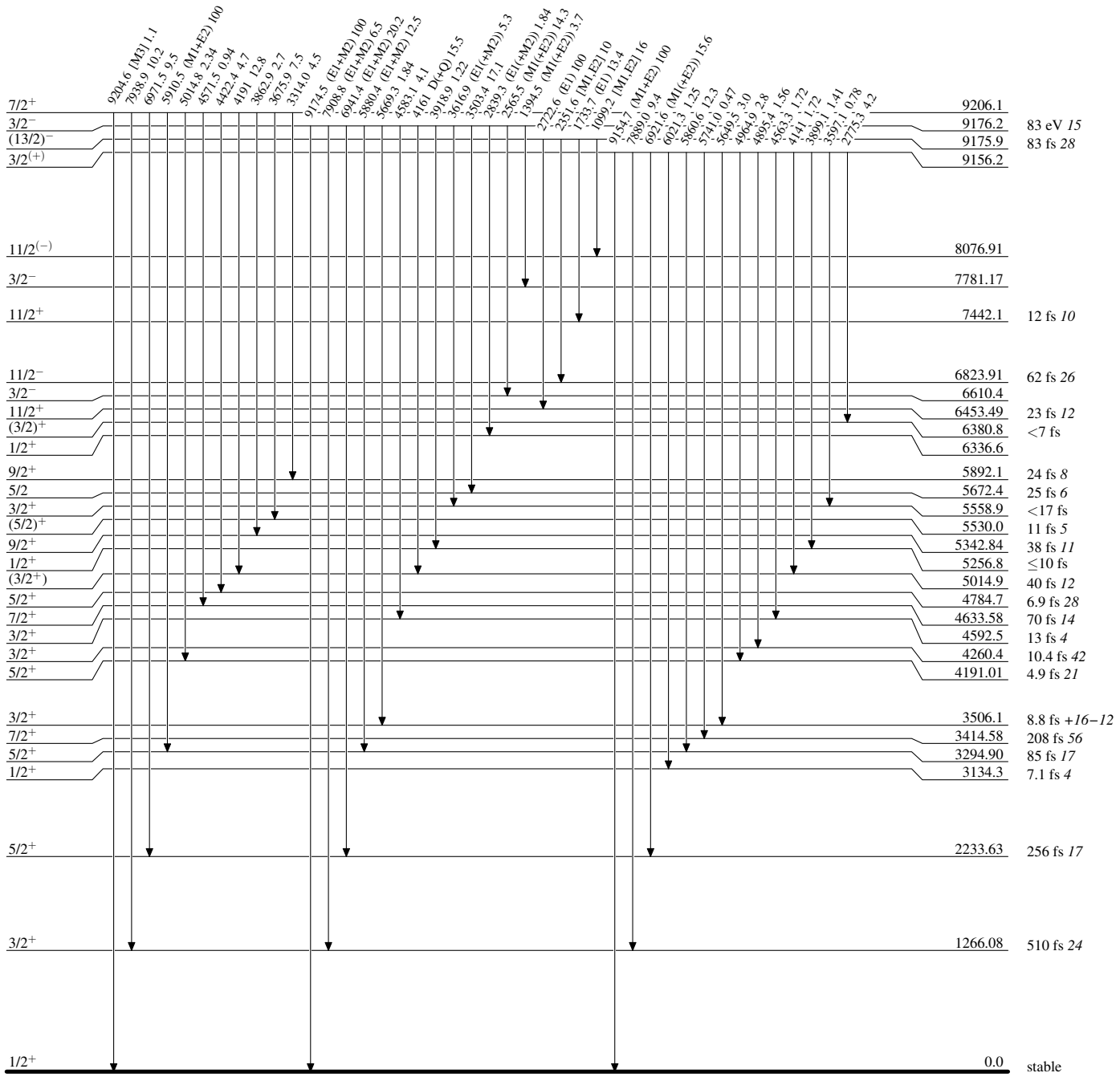


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

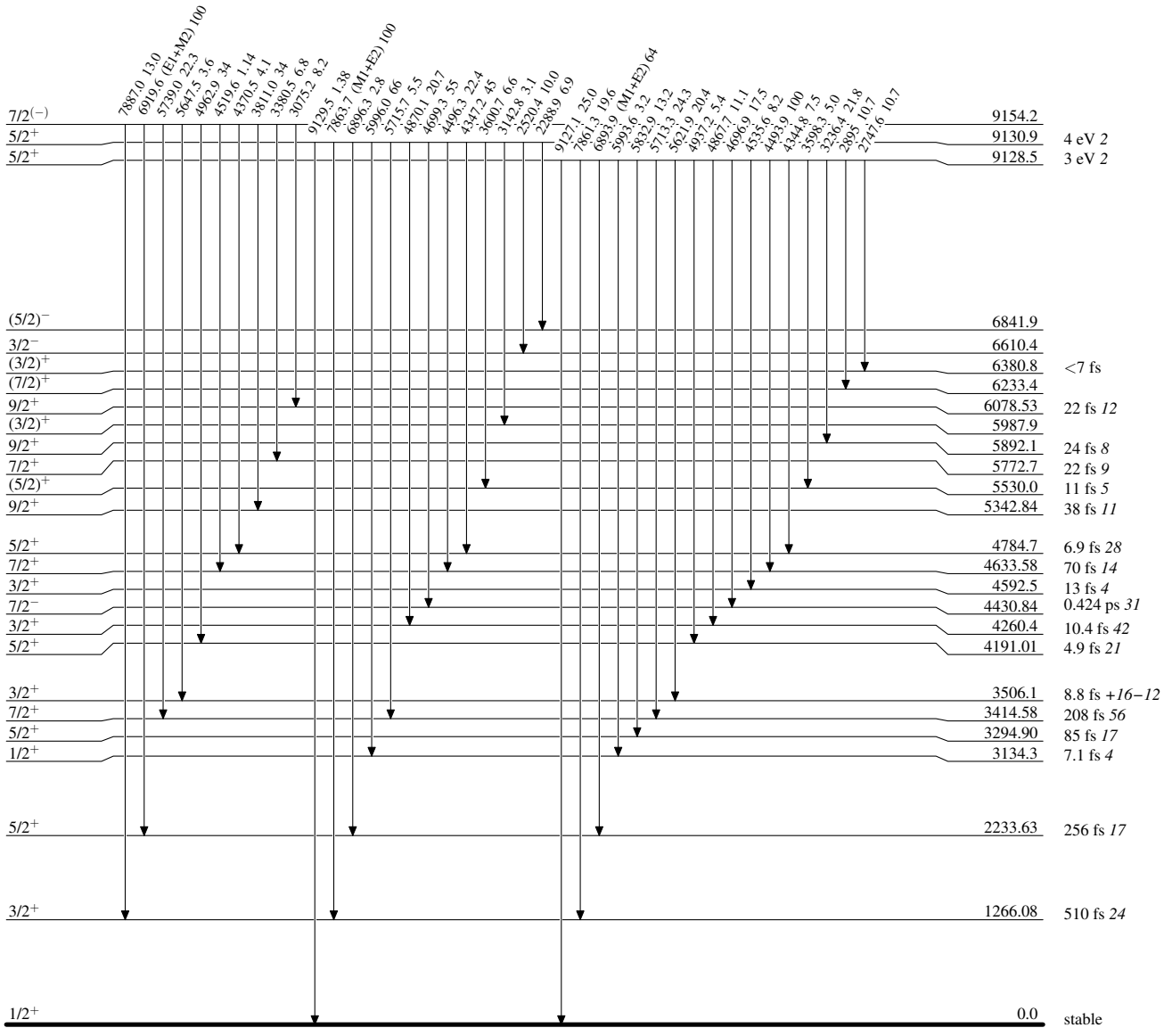


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

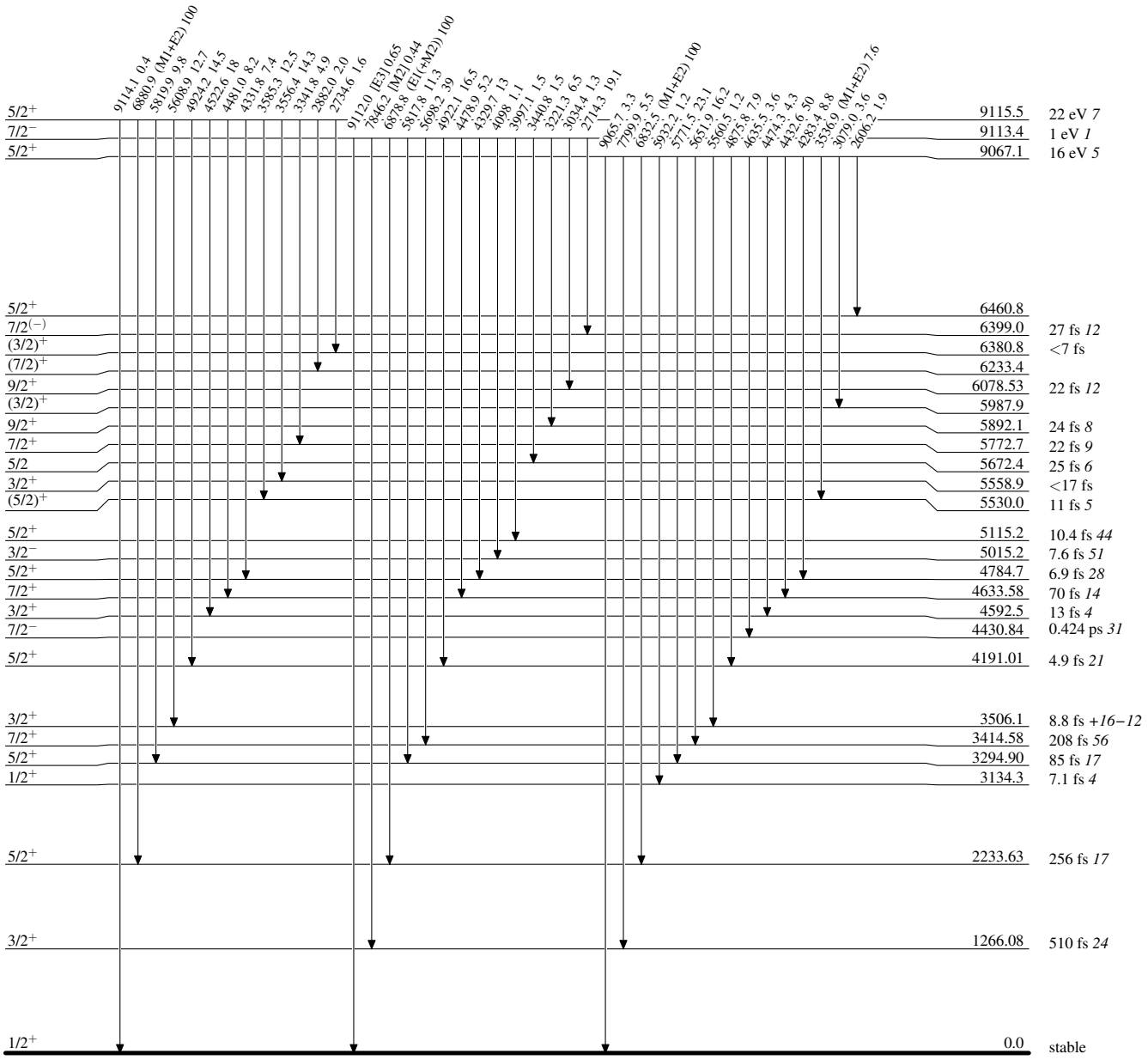


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

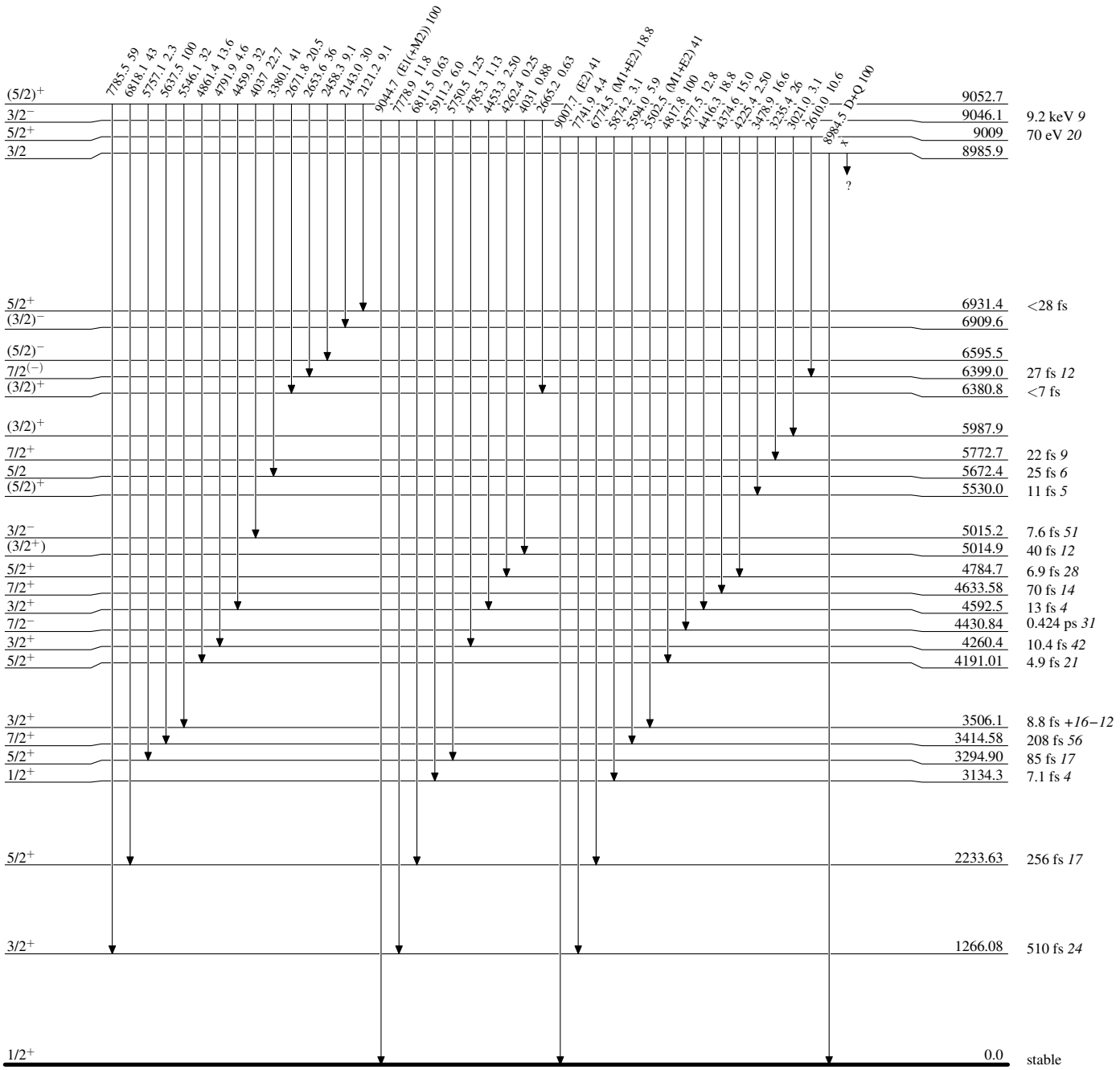


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

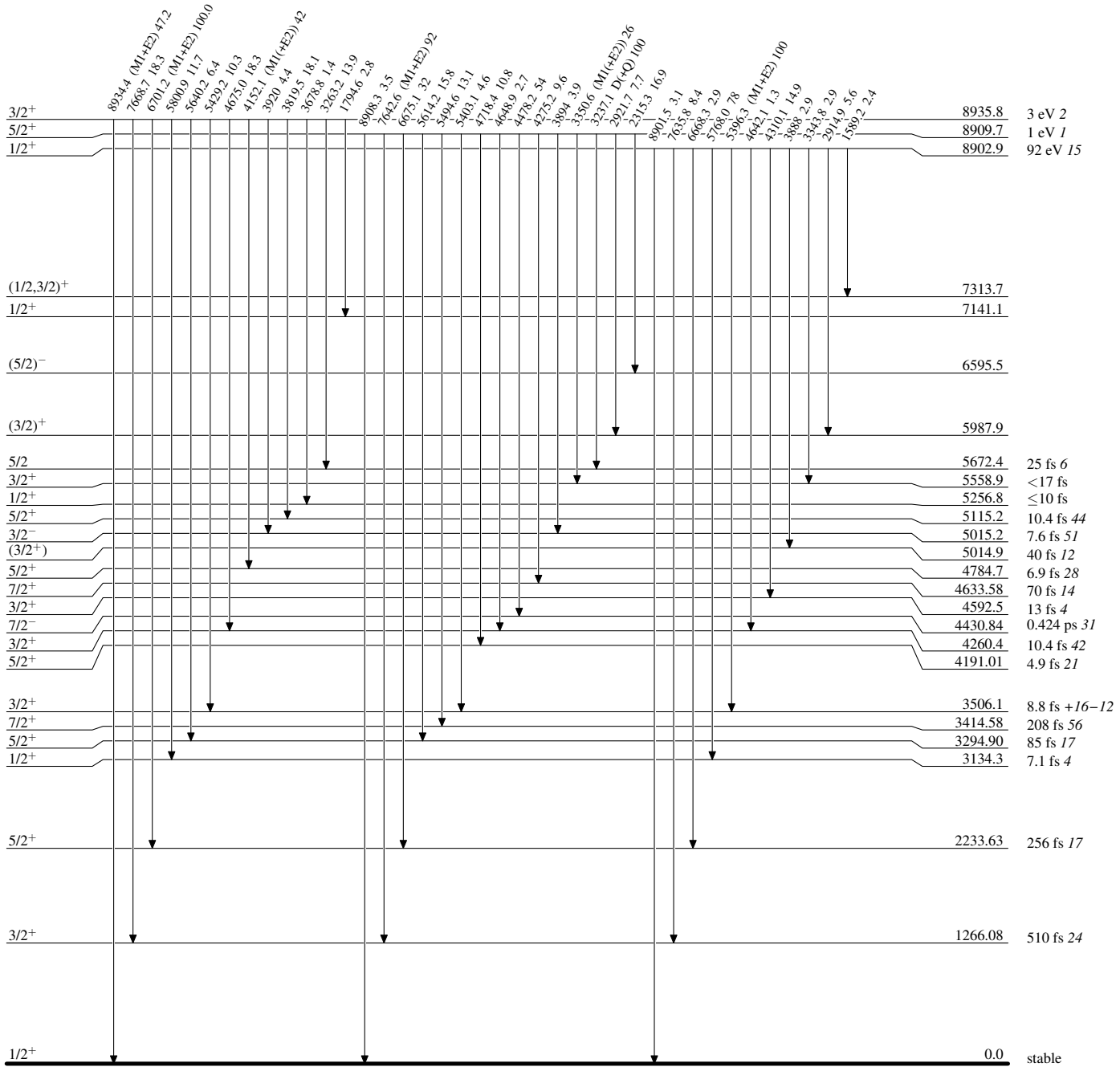


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

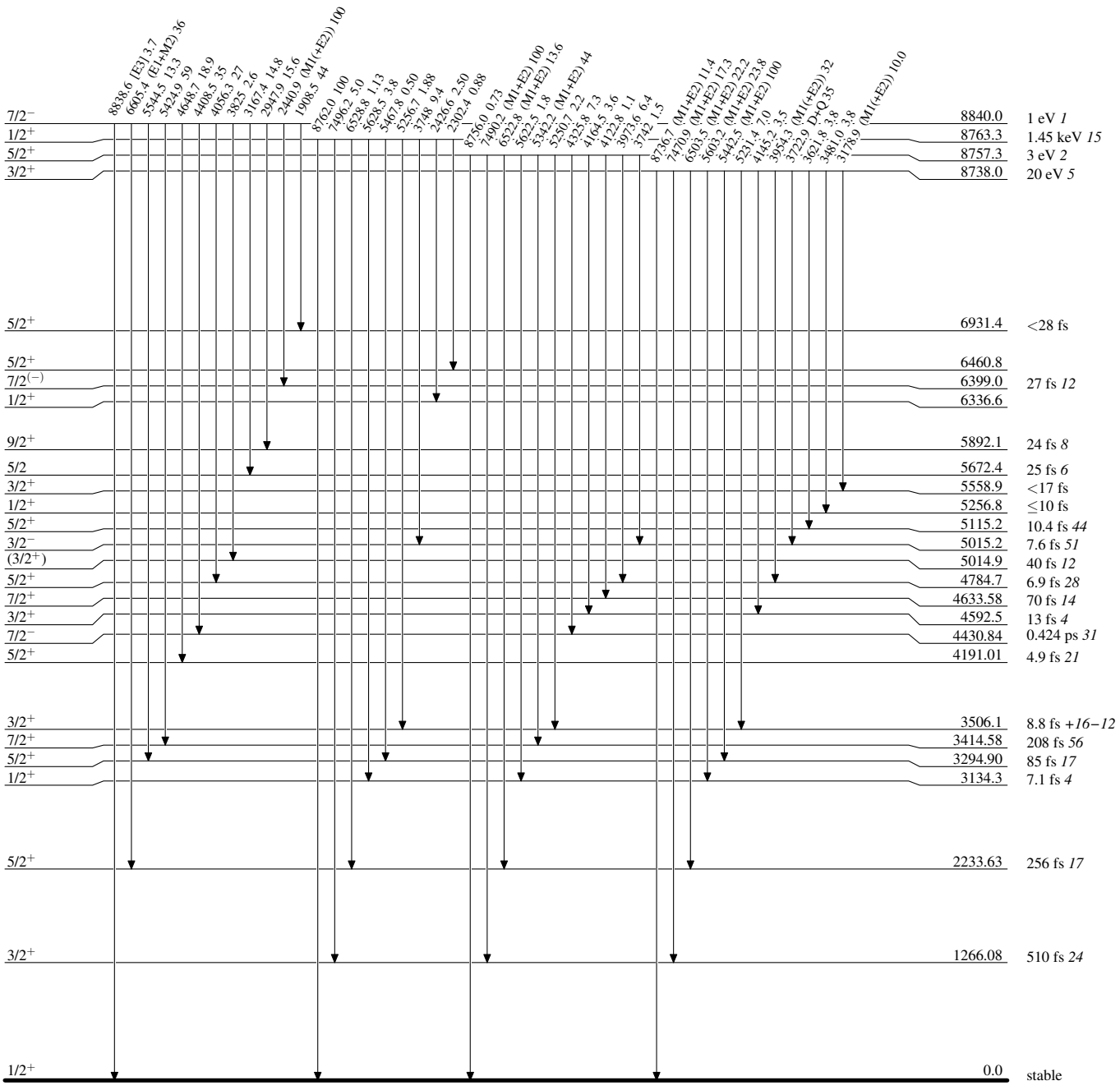


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



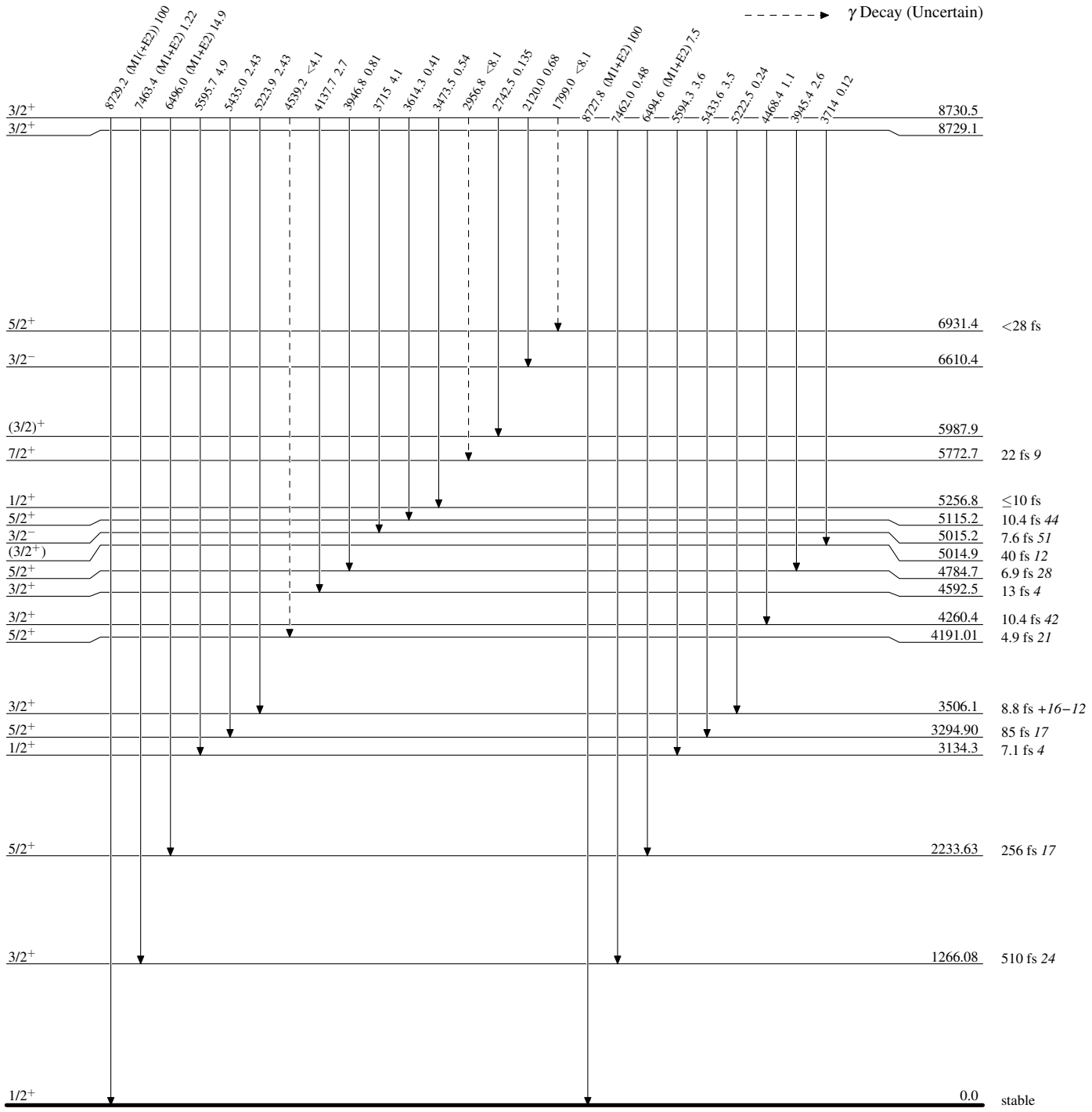
$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

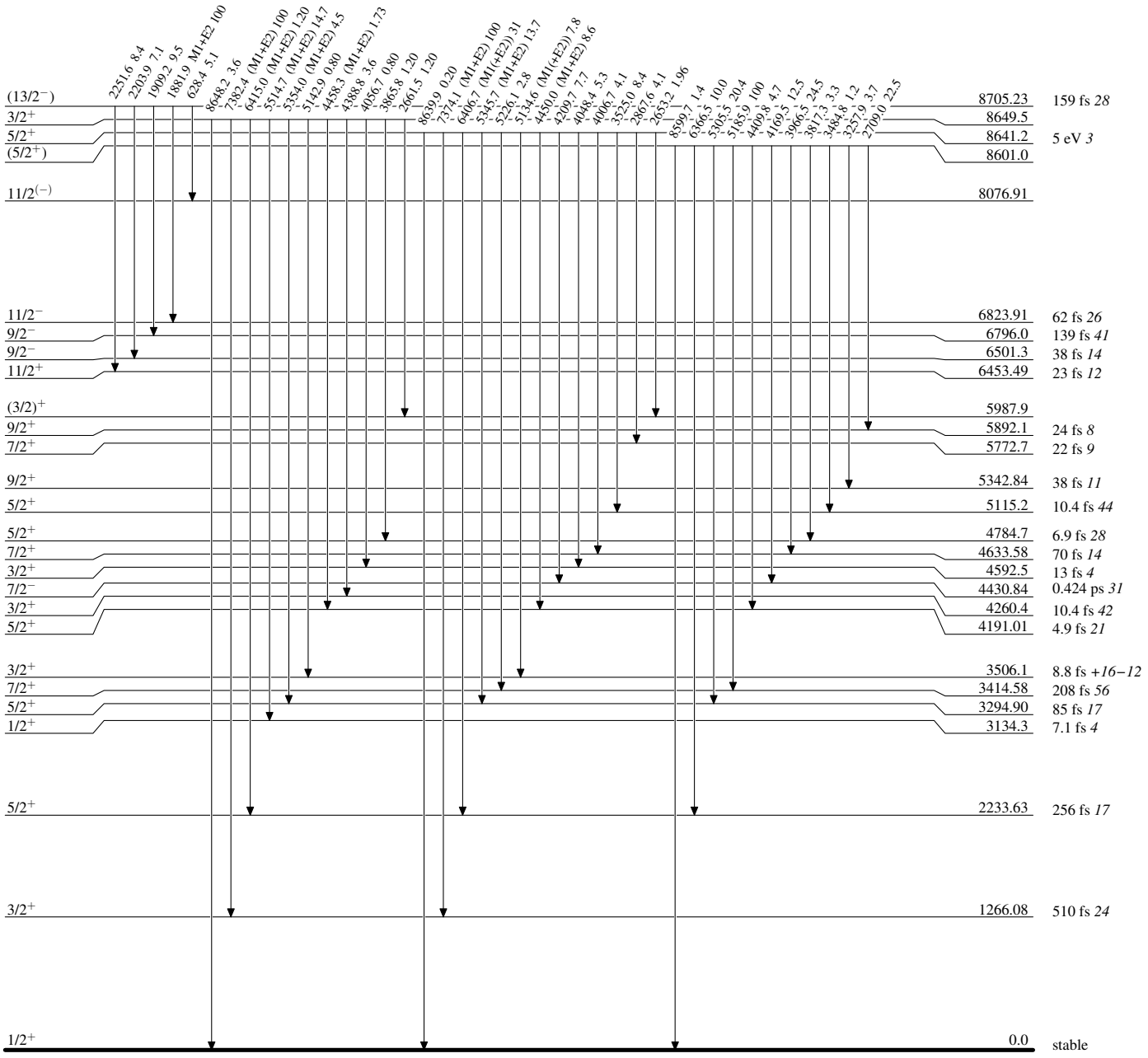


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{31}_{15}P_{16}$

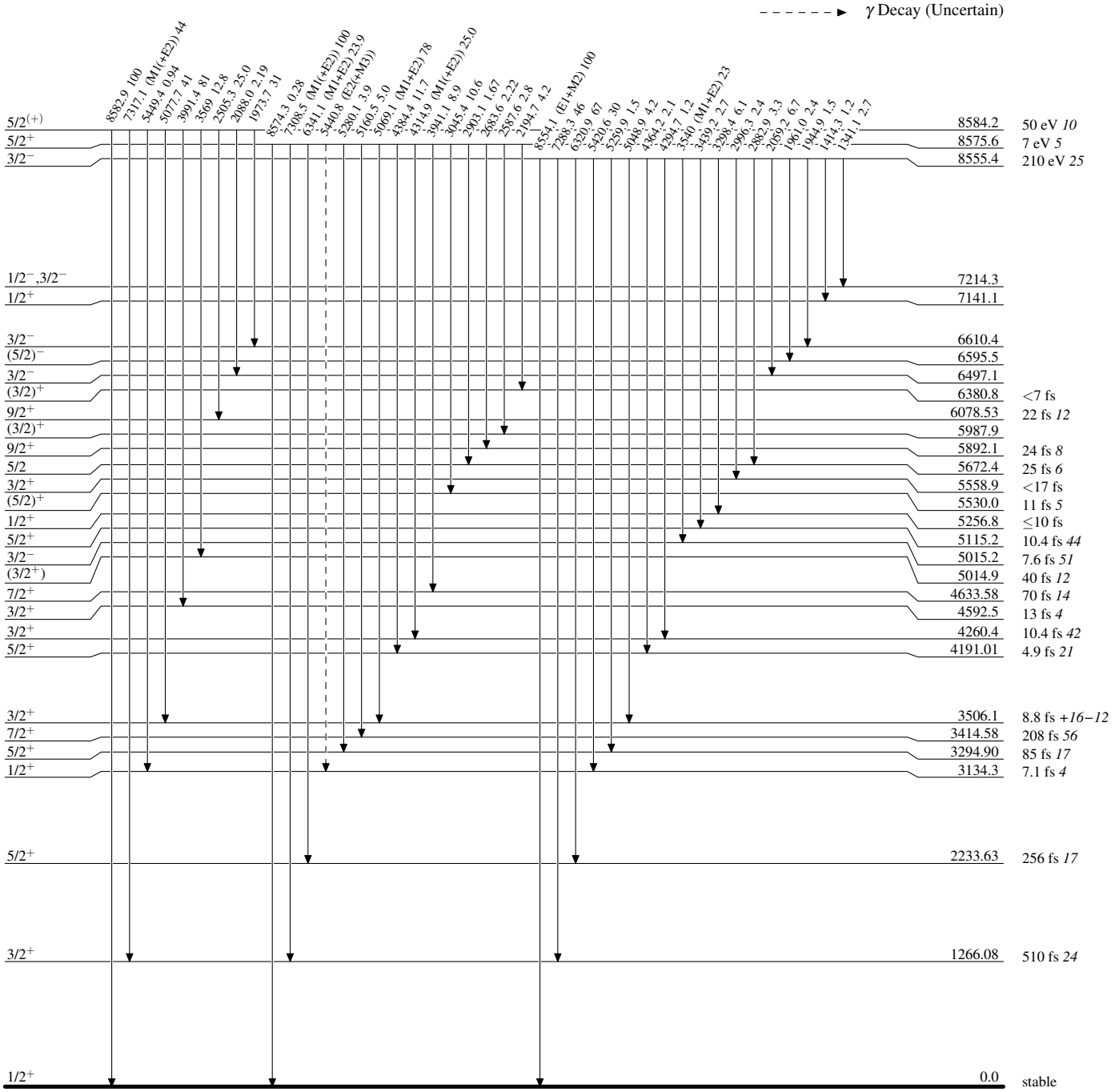
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

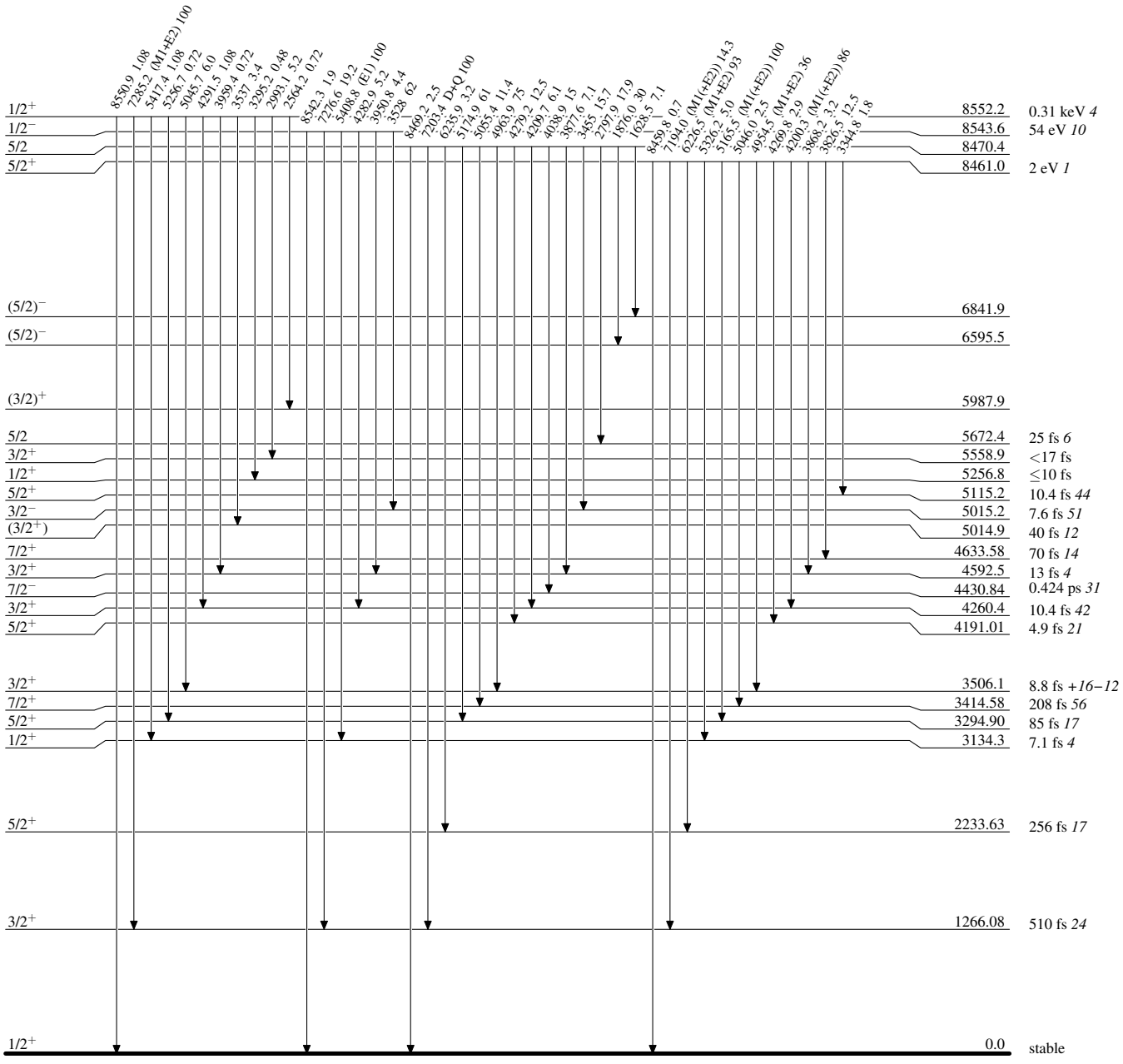


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

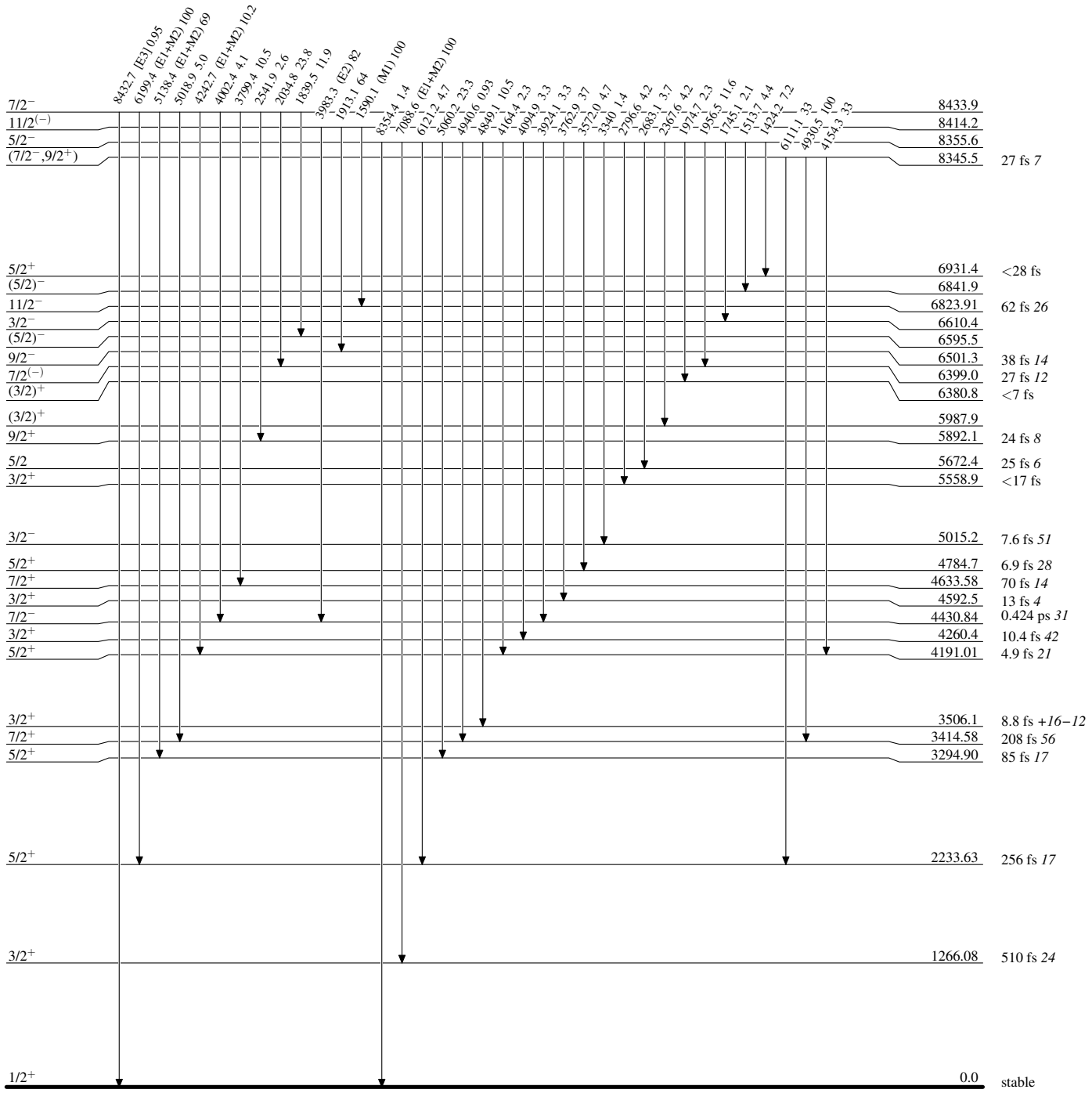


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

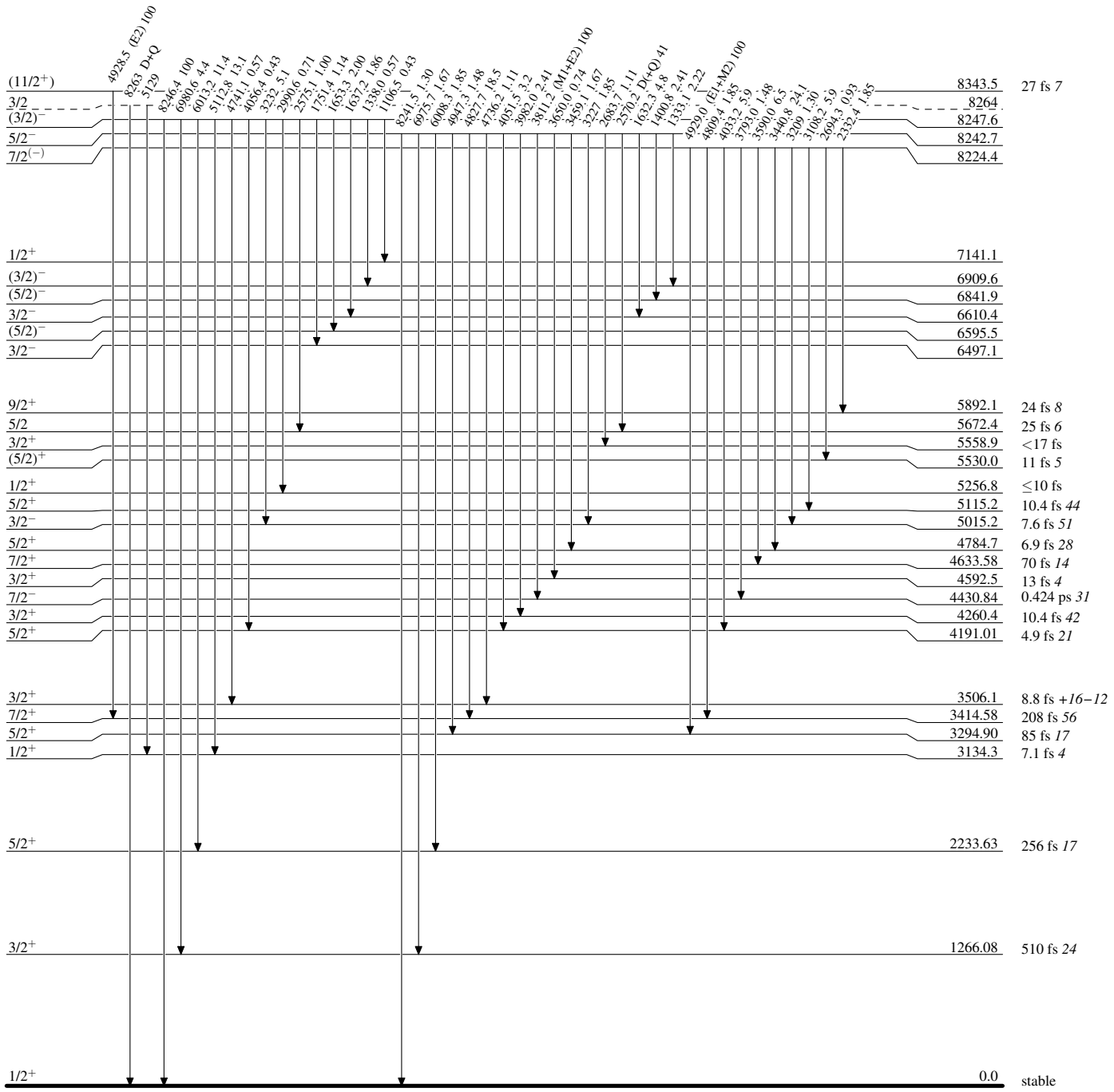


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

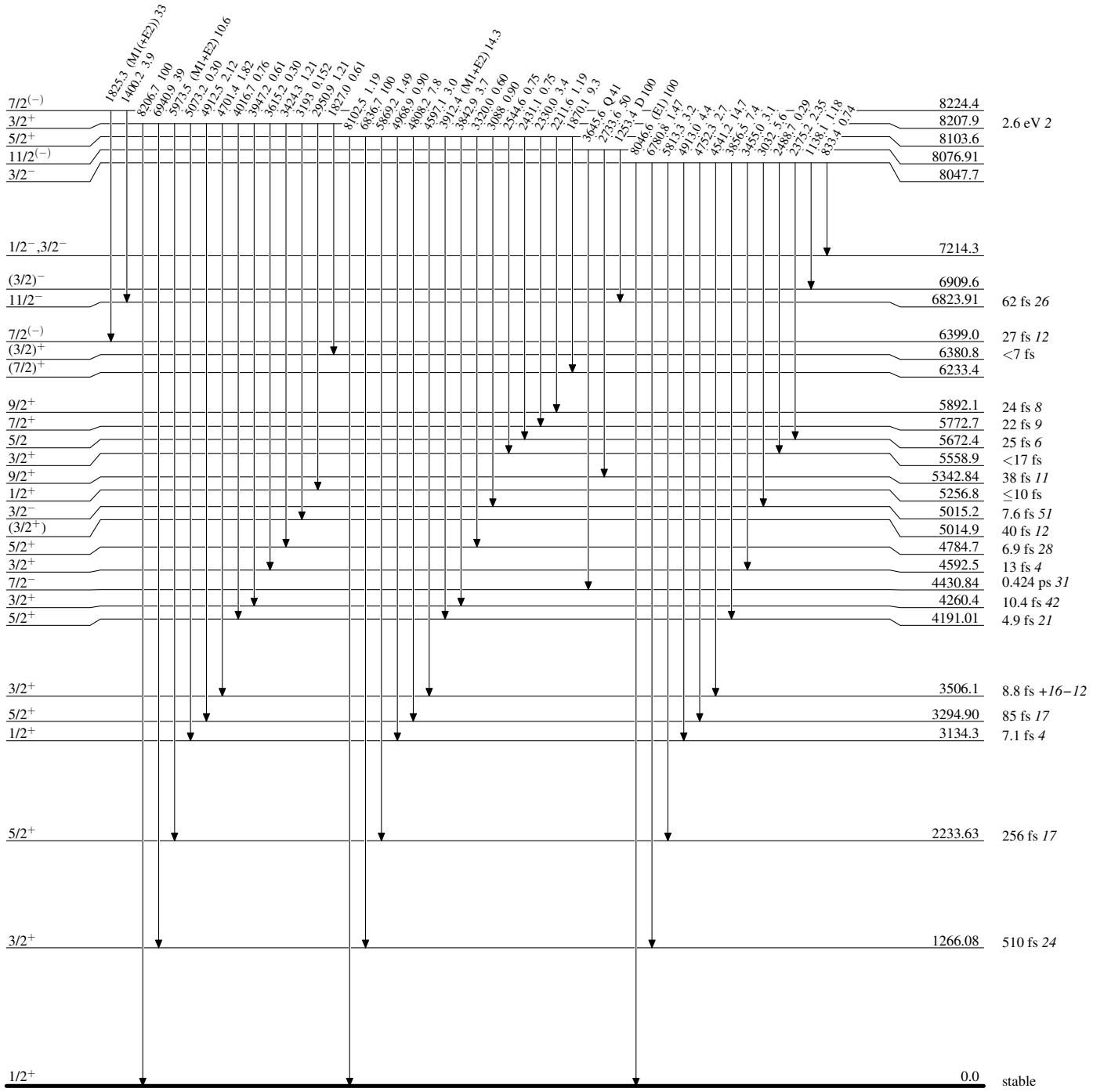


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

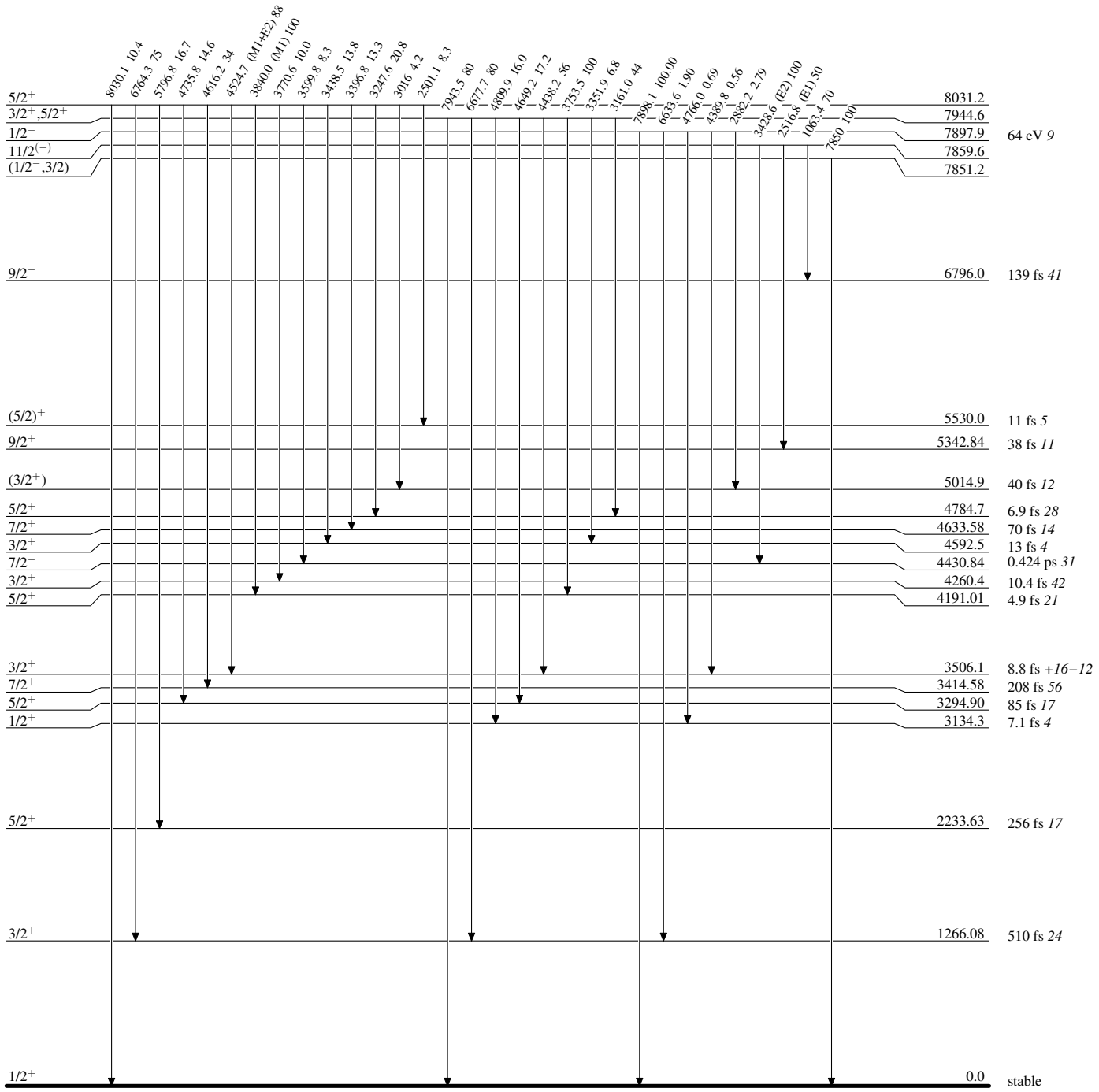


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{31}_{15}P_{16}$

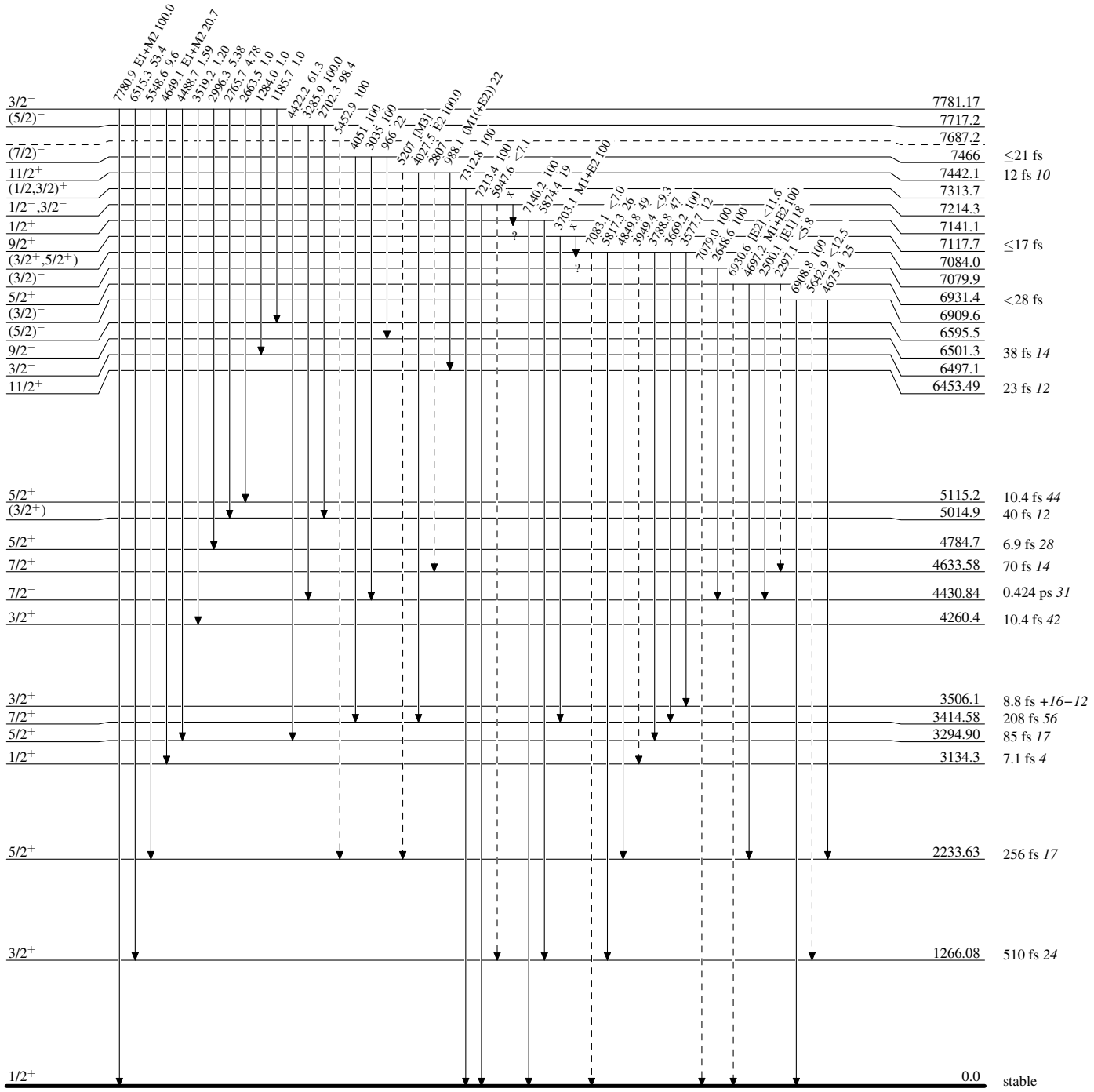
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{31}_{15}P_{16}$

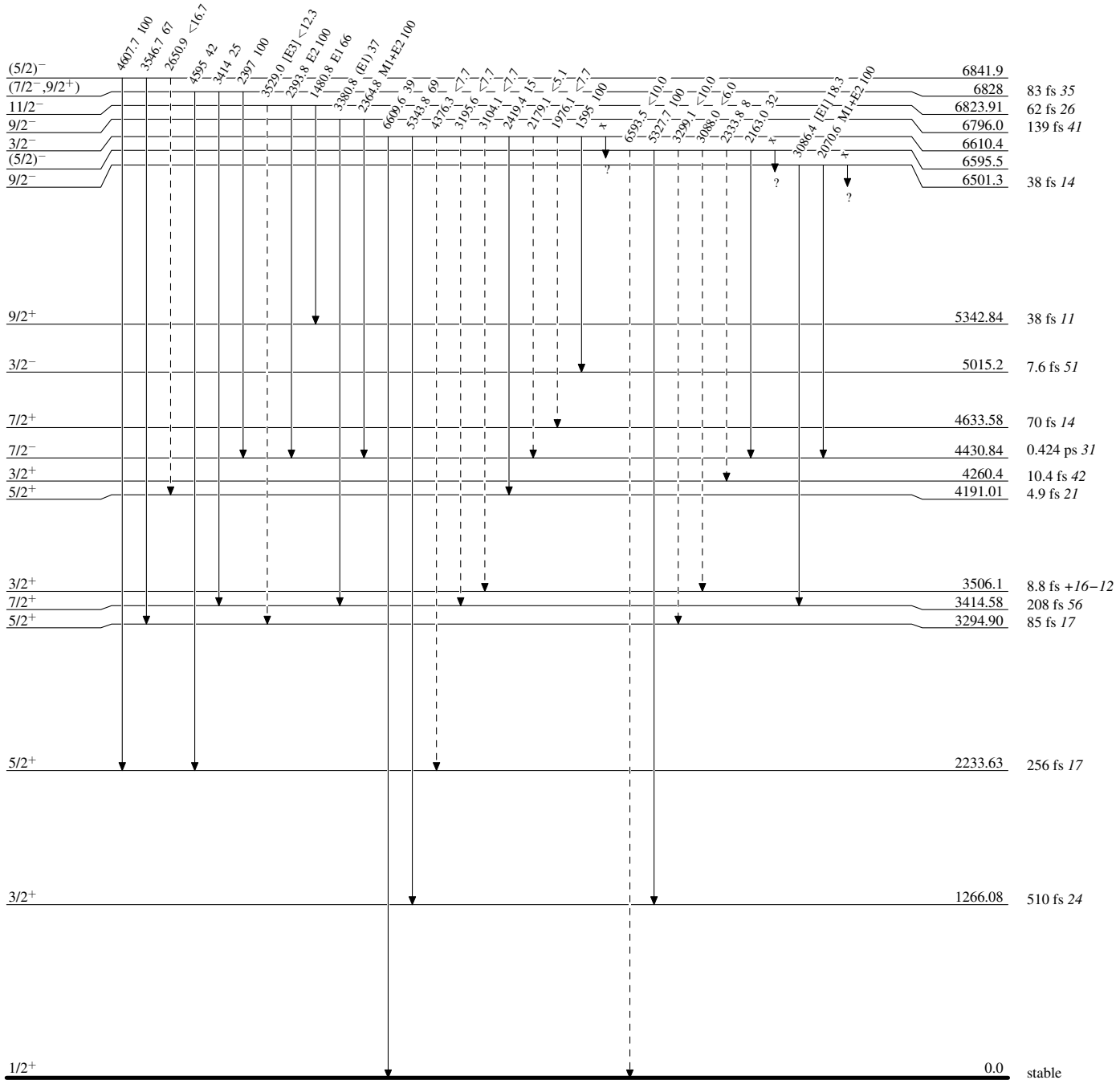
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)

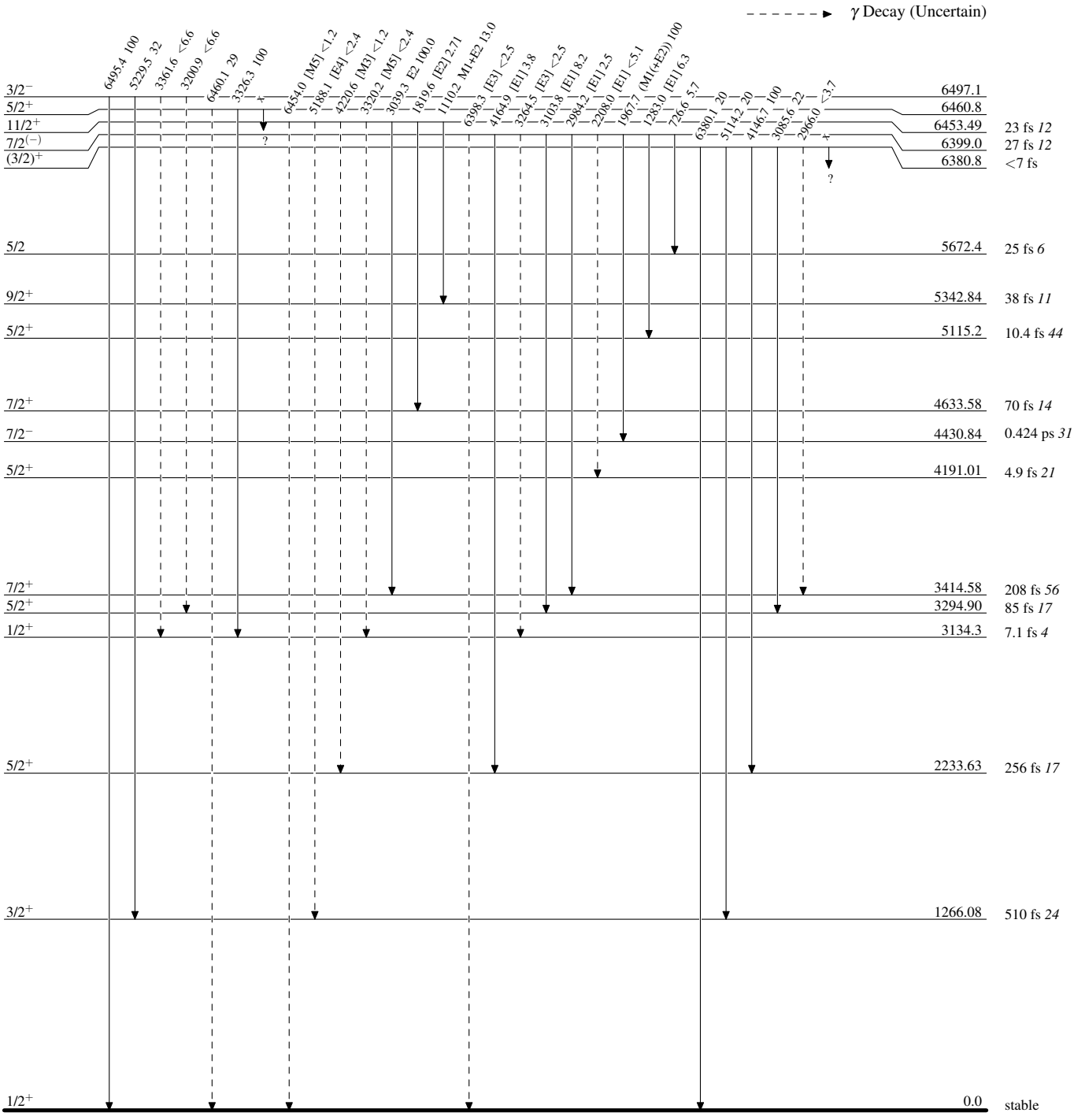


$^{31}_{15}P_{16}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{31}_{15}P_{16}$

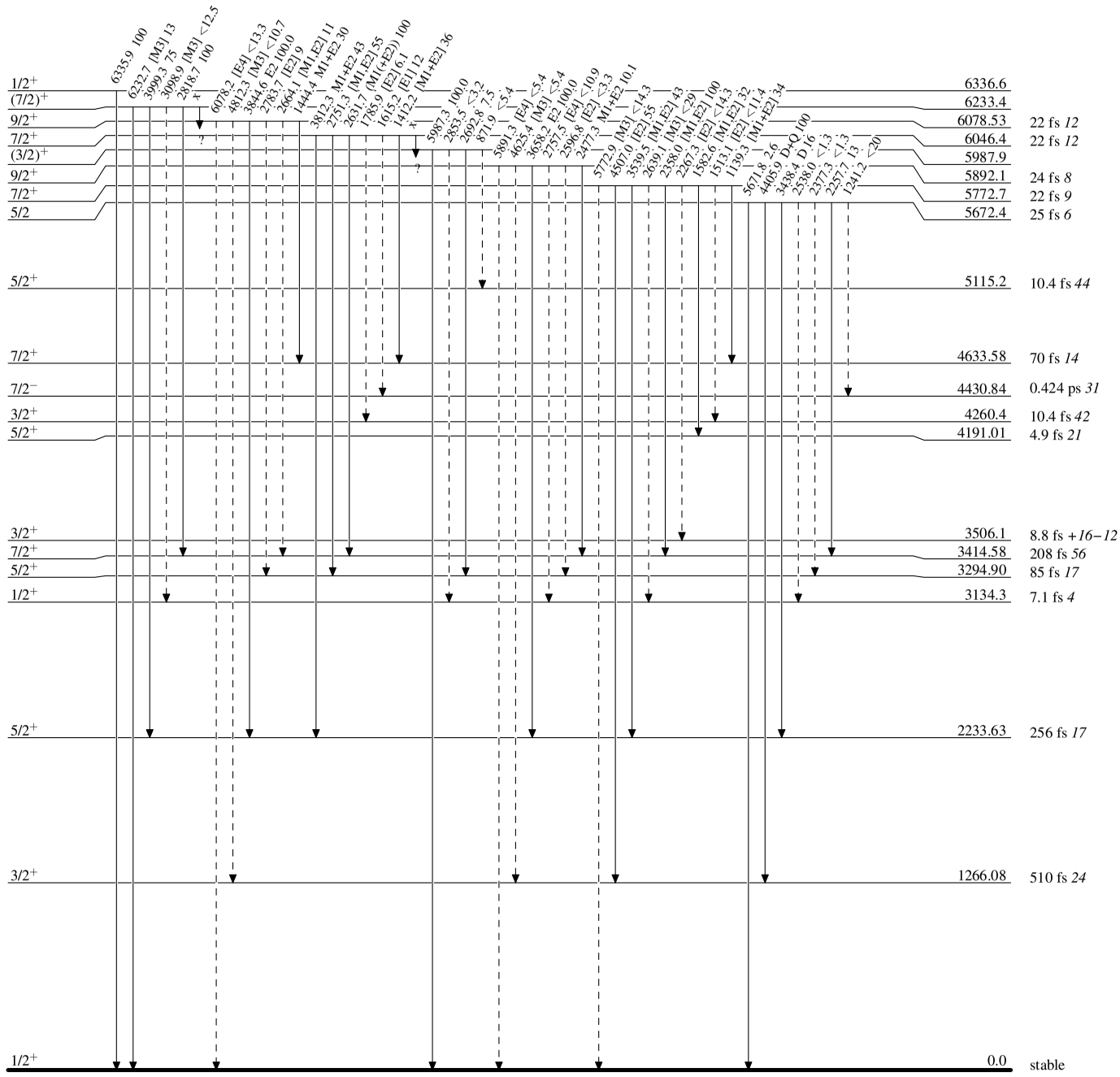
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{31}_{15}P_{16}$

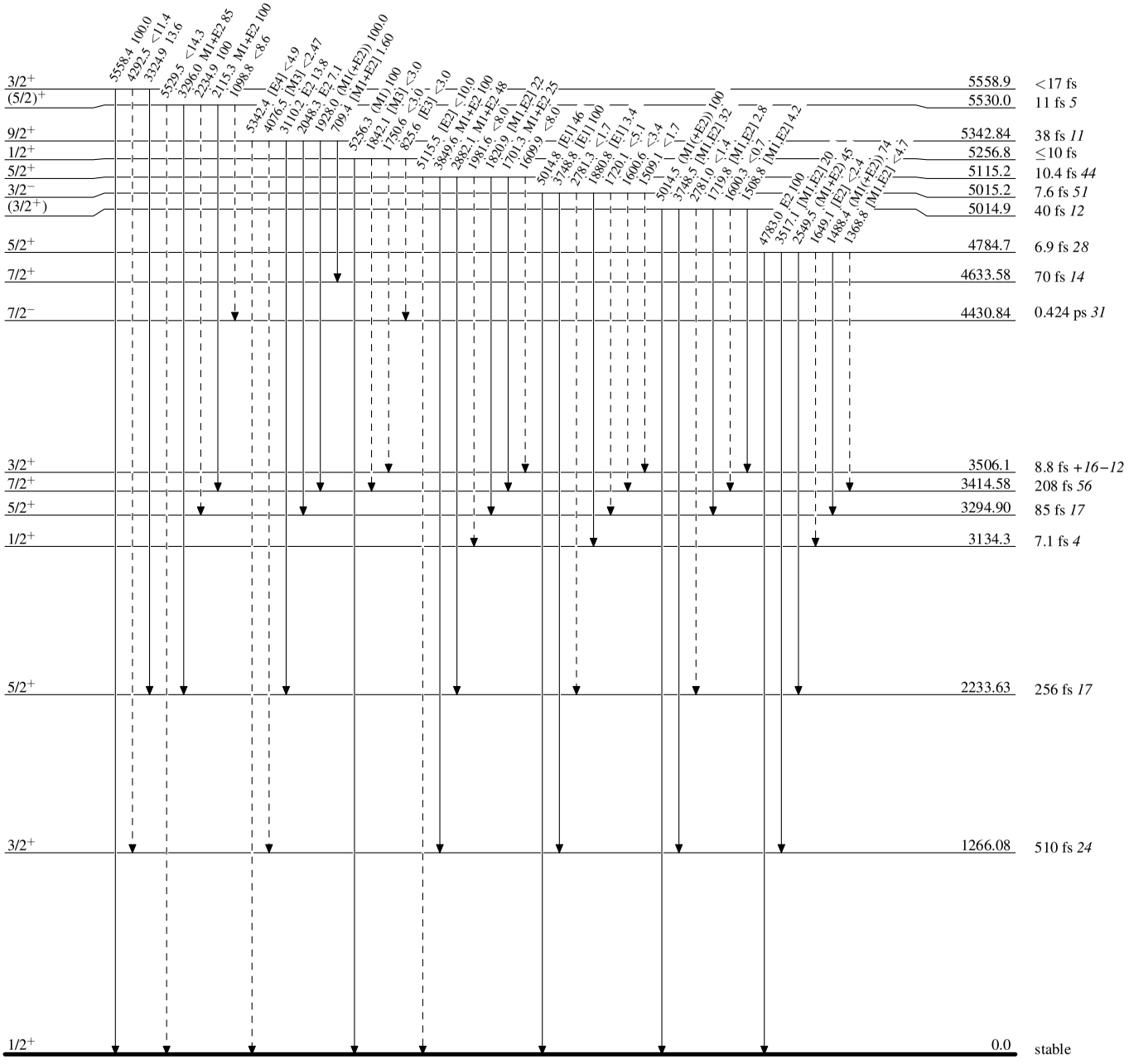
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{31}_{15}P_{16}$

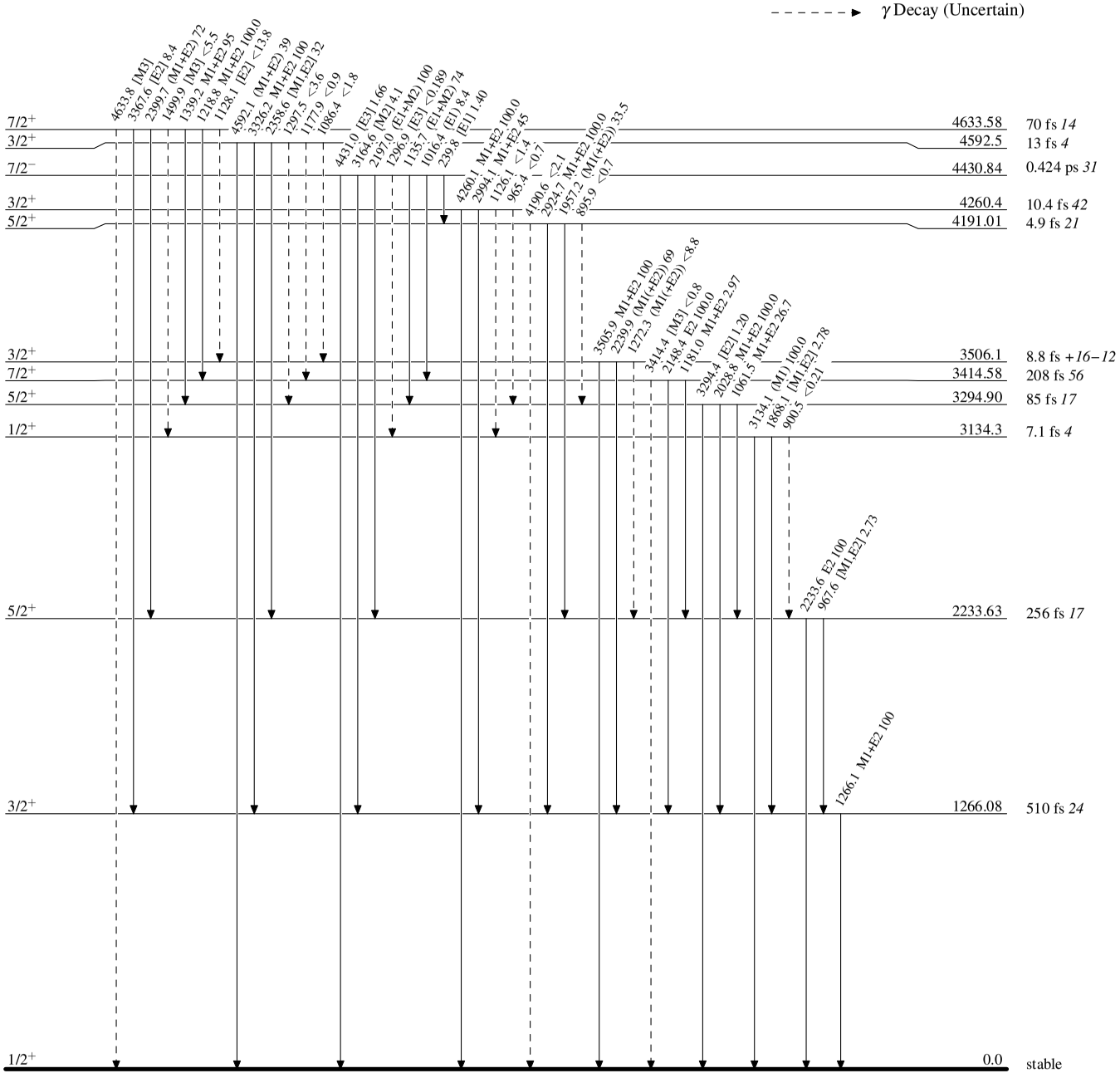
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{31}_{15}P_{16}$