Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171,1 (2021)	1-Jun-2020

Q(β^-)=−4056.179 *32*; S(n)=12419.66 *17*; S(p)=8794.10 *2*; Q(α)=−1.047×10^4 2017Wa10

Q(β^-): From measured value: 4056.182 *32* (2019Ka30) and 4056.179 *32* erratum of 2019Ka30 − Phys. Rev. C 101, 049901 (2020). Other: −4056.34 *16* (2017Wa10).

Other reactions:
^{19}F(α,p): 2018Da14 (E=6 MeV) − 1st excited state was populated.
^{20}Ne(α,pγ): 1975Gr04 (E=10,12 MeV) − measured $T_{1/2}$.
^{23}Na(d,d): 1981Ru09 (E=13.6 MeV).
^{23}Na(^{3}He,^{3}He): 1980Tr02 (E=41 MeV), 1982Ve13 (E=25 MeV), 1973Ro18 (E=11 MeV).
^{25}Mg(p,^{3}He): 1976Na18 (E=40 MeV), 1969Ha38 (E=45 MeV).
^{27}Al(e,α): 1979Fl04 (E=120 MeV).
^{208}Pb(pol ^{23}Na,^{23}Na): 1988Ka29 (E=170 MeV).

^{23}Na Levels

Cross Reference (XREF) Flags

A	^{23}Ne β^- decay	L	^{20}Ne(^{7}Li,α)	W	^{23}Na(p,p′γ)
B	^{23}Mg ε decay	M	^{21}Ne(^{3}He,p)	X	^{23}Na(α,α')
C	^{24}Al β^+p decay	N	^{22}Ne(p,γ)	Y	Coulomb excitation
D	^{7}Li(^{16}O,γ)	O	^{22}Ne(d,n)	Z	^{24}Mg(d,^{3}He)
E	^{11}B(^{16}O,α)	P	^{22}Ne(d,nγ)	Others:	
F	^{12}C(^{12}C,pγ)	Q	^{22}Ne(^{3}He,d),(^{3}He,dγ)	AA	^{24}Mg(t,α),(t,$\alpha\gamma$)
G	^{12}C(^{15}N,α)	R	^{22}Na(n,p),(n,α): res	AB	^{25}Mg(d,α)
H	^{12}C(^{16}O,αpγ)	S	^{23}Na(γ,γ')	AC	^{26}Mg(p,$\alpha\gamma$)
I	^{19}F(α,γ)	T	^{23}Na(e,e′)	AD	^{27}Al(d,^{6}Li)
J	^{19}F(^{6}Li,d)	U	^{23}Na(n,n′γ)	AE	^{150}Nd(^{26}Mg,^{23}Naγ)
K	^{20}Ne(α,p)	V	^{23}Na(p,p′),^{22}Ne(p,p′)		

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
0.0[f]	3/2$^+$	stable	ABCDEFGHI KLMNOPQRSTU WXYZ	XREF: Others: AA, AB, AC, AD, AE μ=+2.21750 *3*; Q=+0.104 *1* Matter radius <r^2>$^{1/2}$=2.83 fm *3* and 2.83 fm *4* (1998Su07). Charge radius <r^2>$^{1/2}$=2.9936 fm *21* (2013An02). Jπ: 3/2 from Atomic beam, optical spectroscopy: 1933Gr03, 1933Jo04, 1934El02, 1934Ra01. Parity from L=2 in ^{22}Ne(^{3}He,d). μ: From 2019StZV − NMR (+2.2174982 *233* in 2012An18 − ab initio calculation). Other values: +2.2176556 *6* − NMR (1954Wa37), +2.217522 *2* − ABMR (1974Be50). Q: Optical spectroscopy (2008Py02/2006Da14, 2016St14). Other values: +0.1045 *10* (1999Ke12,2014StZZ), +0.109 *3* (1992Su01), +0.095 *15* (1992Vo09), many others in the literature.
440.2[f] *4*	5/2$^+$	1.14 ps *7*	AB DEFGHI K MNOPQ S U WXYZ	XREF: Others: AA, AB, AC, AD Jπ: L=2 in (^{3}He,d), 5/2 in 1966Po06 (p,$\alpha\gamma$) based on their $\gamma(\theta)$ measurements and references therein including Coul.

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
				Ex. (1956Te33) γ(θ) data. T or Γ: From mean lifetime of 1.64 ps *10*: Weighted average of 1.8 ps *+4−3* (1959Ra10 − (p,p′)); 1.50 ps *25* (1961Am04), 1.8 ps *2* (1969Ru01), 1.80 ps *28* (1962Mo17), and 1.62 ps *10* (1966Sk01), 1.30 ps *30* (1963Sw01,1963Sw02) − all from (γ,γ′); 1.63 ps *20* (1973Wa26) and 1.80 ps *11* (1990Ti02) from (^{12}C,pγ); 1.69 ps *22* (1977Sc36 − DSA see Coul Ex.), 1.40 ps *30* (1975Gr04), 1.50 ps *30* (1959Bo44), 1.42 ps *22* and 1.37 ps *24* (both from Coul Ex.).
2076.2[f] *4*	7/2+	27 fs *3*	A DEFGHI KLMNO Q STU WXYZ	XREF: Others: AA, AB, AC, AD Jπ: L(t,α)=4 from 0+ target and M1+E2 γ to 5/2+, 7/2 from (p,p′γ) (1968So07). T or Γ: From mean lifetime of 39 fs *5*: Weighted average of 37 fs *9* (1970Bi14), 28 fs *7* (1973Me11), 42 fs *7* (1975An14) and 35 fs *5* (1979Sm02) − all from (p,γ); 50 fs *15* (1973Fr07 − (^{12}C,pγ)); 49 fs *11* (1967Af03 − (α,p)), 46 fs *8* (1969Sa16 − (e,e′)), 45 fs *9* (1971Ra13 − (γ,γ′)), 50 fs *7* (1977Sc36 − Coul Ex.), 37 fs *9* (1975Gr04 − (α,pγ)), and 27 fs *9* (1989Ge09 − (n,n′γ)). Other mean lifetimes: 19 fs *4* (1971Du07 − (p,γ)) − yields higher χ^2 than critical if considered, 120 fs *60* (1977Sc36 − DSA see Coul Ex.), 210 fs *60* (1972Du05 − (p,p′γ)).
2390.9 *3*	1/2+	0.60 ps *14*	B EFG I KLMNOPQ S U W Z	XREF: Others: AA, AB, AC, AD Jπ: L(d,n)=0 from 0+ target. T or Γ: From mean lifetime of 866 fs *200*: weighted average of 760 fs *240* (1979Sm02), 850 fs *200* (1975An14), and 750 fs *600* (1970Bi14), 580 fs *+370−190* (1971Du07) − all from (p,γ); 950 fs *200* (1969Po06), 700 fs *250* (1970Ma15), and 1550 fs *400* (1972Du05) − from (p,p′γ), 1200 fs *600* (1973Fr07 − (^{12}C,pγ)). Other: >500 fs (1973Me11) from (p,p′γ)).
2640.5[g] *6*	1/2−	76 fs *9*	efG I LMN PQ S U W Z	XREF: Others: AA, AB, AC, AD Jπ: L=1 in ^{22}Ne(^{3}He,d),(^{3}He,dγ). 1/2 from γ-ray angular correlation studies − (p,αγ) (1972Li02). T or Γ: From mean lifetime of 109 fs *13*: Weighted average of 113 fs *18* (1975An14), 100 fs *20* (1970Bi14), 88 fs *+20−14* (1971Du07), 92 fs *18* (1979Sm02), 119 fs *13* (1983Ke12 − unc 5 from w.a. in ref. − evaluators take lowest value) − all from (p,γ); 135 fs *20* (1971Ra13 − (γ,γ′)), 100 fs *+80−40* (1970Ma15 − (p,p′γ)), 95 fs *35* (1973Fr07 − (^{12}C,pγ)), and 200 fs *80* (1969Po06 − (p,p′γ)). Others: 365 fs *100* (1972Du05 − (p,p′γ)), 390 fs *20* (1989Ge09 − (n,n′γ)), 58 fs *10* (1973Me11 − (p,γ)).
2703.8[f] *5*	9/2+	88 fs *7*	eFGH KLMN Q U WX Z	XREF: Others: AA, AB, AC, AD XREF: K(2680). Jπ: L=4 in (t,α) from 0+ target and E2 to 5/2+; 9/2 from angular correlation measurements (p,p′γ) (1968So07). T or Γ: From mean lifetime of 127 fs *10*: Weighted average of 200 fs *100* (1969Po06), 100 fs *+80−40* (1970Ma15), 100 fs *30* (1972Du05) − all from (p,p′γ); 125 fs *30* (1973Fr07), 110 fs *20* (1973Wa26), 139 fs *10*

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
				(1990Ti02) – from (^{12}C,pγ); 130 fs *30* (1975An14 – (p,γ)), 105 fs *20* (1975Gr04 – (α,pγ), and 260 fs *110* (1989Ge09 – (n,n′γ)). Other: 65 fs *15* (1973Me11 – (p,γ)) – yields higher χ^2 than critical if considered.
2982.0 *5*	3/2$^+$	3.3 fs *4*	A EFG I KLMNOPQ S U W Z	XREF: Others: AA, AB, AC, AD Jπ: L=2 in ^{22}Ne(^{3}He,d),(^{3}He,dγ). 5/2 excluded by 1971Ra13 (γ,γ′) based on δ analysis of 2541.3γ and linear polarization measurements from their earlier experiment. T or Γ: From mean lifetime of 4.7 fs *6*: Weighted average of 4.0 fs *+13−10* (1971Du07), 2.8 fs *20* (1973Me11), 3.4 fs *10* (1975An14) 6.3 fs *10* (1970Bi14) – all from (p,γ); 3.8 fs *8* (1984Vo02), 9 fs *4* (1972Sh07) 4.7 fs *8* (1966Ra19), 5.4 fs *6* (1971Ra13) – all from (γ,γ′)). Other mean lifetime values: <3 fs (1979Sm02 – (p,γ); <100 fs (1973Fr07 – (^{12}C,pγ)); <25 fs (1972Du05), <79 (1970Ma15), <50 fs (1969Po06) all from (p,p′γ).
3677.9[g] *5*	3/2$^-$	21 fs *3*	EFG I LMN Q U W Z	XREF: Others: AA, AB, AC, AD Jπ: L=1 in ^{22}Ne(^{3}He,d),(^{3}He,dγ). 3/2 from γ-ray angular correlation studies – (p,αγ) (1972Li02). T or Γ: From mean lifetime of 31 fs *4*: Weighted average of 35 fs *6* (1970Bi14), 24 fs *+5−4* (1971Du07), 26 fs *4* (1973Me11), 43 fs *9* (1979Sm02), 42 fs *7* (1975An14) – all from (p,γ); 70 fs *40* (1972Du05 – (p,p′γ)). Other: <40 fs (1973Fr07 – (^{12}C,pγ)).
3847.9[g] *5*	5/2$^-$	87 fs *21*	eFG I kLMN Q U W Z	XREF: Others: AA, AB, AC, AD XREF: U(3853)AD(3863). Jπ: E1(+M2) to 7/2$^+$, γ to 3/2$^+$, and RUL. T or Γ: From mean lifetime of 125 fs *30*: Weighted average of 115 fs *35* (1970Bi14), 170 fs *60* (1971Du07), 95 fs *30* (1973Me11), 120 fs *35* (1979Sm02), 140 fs *30* (1975An14) – all from (p,γ); 120 fs *35* (1973Fr07 – (^{12}C,pγ)); 170 fs *50* (1972Du05) – (p,p′γ).
3914.6 *4*	5/2$^+$	6.9 fs *14*	eFG I kLMN Q S U W Z	XREF: Others: AA, AB, AC, AD Jπ: L=2 in (t,α), (^{3}He,d), and (d,n). 5/2 1970Po08 (t,αγ) – based on γ-ray angular distribution measurements and RUL. T or Γ: From mean lifetime of 12 fs *2*: Weighted average of 12 fs *2* (1970Bi14), 7.4 fs *25* (1971Du07), 11 fs *3* (1973Me11), 10 fs *4* (1979Sm02), 14 fs *3* (1975An14) – all from (p,γ); 14 fs *2* (1984Vo02 – (γ,γ′)). Others: 25 fs *14* (1973Fr07 – (^{12}C,pγ)), 60 fs *15* (1972Du05 – (p,p′γ)).
4429.63[‡] *16*	1/2$^+$	0.21 fs *2*	F KLMNO Q STU W Z	XREF: Others: AA, AB, AC, AD XREF: T(4500). Jπ: L=0 in (d,^{3}He), (^{3}He,d), and (t,α). T or Γ: From mean lifetime of 0.30 fs *3*: Weighted

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
				average of 0.29 fs *3* (1964Me11), 0.24 fs *4* (1972Sh07), and 0.34 fs *4* (1984Vo02), 0.35 fs 7 (1985Ba36) − all from (γ,γ′). Others: 0.94 fs *8* (e,e′), <25 fs (1973Fr07 − (^{12}C,pγ)), 2 fs *2* (1973Me11 − (p,γ)), <45 fs (1972Du05) − (p,p′γ)).
4775.2 *5*	7/2$^+$	<1.4[‡] fs	E G KLMNO Q U W Z	XREF: Others: AA, AB, AC, AD Jπ: L=4 in ^{24}Mg(t,α), 4335γ M1+E2 to 5/2$^+$.
5378.56[‡] *15*	5/2$^+$	143[#] as *21*	FG KLMNO Q S UV Z	XREF: Others: AA, AB, AC, AD Jπ: L=2 in (^{3}He,d) and (t,α). M1(+E2) to 7/2$^+$.
5534.2[f] *6*	11/2$^+$	10.4[d] fs *6*	EFGH L Q UV Z	XREF: Others: AA, AB, AC, AD Jπ: From 1975Jo03 (^{12}C,pγ), based on particle γ-ray linear polarization and angular correlation measurements of 3458γ.
5741.0[#] *15*	5/2$^+$	394[#] as *27*	eFG NO Q S UV	XREF: Others: AA, AB, AC, AD XREF: AA(5748). Jπ: L=2 in ^{22}Ne(^{3}He,d) and pγ(θ) (1989Ba42 − (p,γ)).
5766.03[‡] *16*	3/2$^+$	351[#] as *41*	e G N S UV	XREF: Others: AA, AB, AD Jπ: M1+E2 γ to 3/2$^+$, γ′s to 1/2$^-$ and 5/2$^-$.
5776 *6*			G Q Z	XREF: Others: AB E(level): From (d,α).
5925.8 *5*	7/2$^+$	13 fs *5*	FG LmN Q UV	XREF: Others: AA, AB, AC, AD XREF: U(5934)AD(5910). Jπ: From pγ(θ) measurements of resonance level → 5740 → g.s. cascade and transition strength analysis (1989Ba42 − (p,γ)). E2 γ to 3/2$^+$.
5965.9 *9*	3/2$^-$	<11 fs	eF Lm O Q S UV Z	XREF: Others: AA, AD XREF: O(5940)AA(5971)AD(5950). Jπ: L=1 in (t,α),(t,αγ), γ to 5/2$^+$ and RUL (≠1/2$^-$ from B(M2)(W.u.)>6.8).
6041.9[g] *6*	7/2$^-$	6 fs *2*	eFG L N Q UV	XREF: Others: AA, AB, AC, AD Jπ: From pγ(θ) measurements and transition strength analysis (1989Ba42 − (p,γ)). (E2) to 3/2$^-$.
6115.1 *6*	(11/2)$^+$	35[d] fs *9*	FGH L Q V	XREF: Others: AA, AB, AC, AD Jπ: M1 to 9/2$^+$, γ to 7/2$^+$, M1+E2 γ from 13/2$^+$ at 7268-keV level.
6194.6[‡] *2*	5/2$^-$	<70 fs	G L N Q V	XREF: Others: AA, AB, AC Jπ: From pγ(θ), γ to 1/2$^-$, and transition strength analysis (1989Ba42 − (p,γ)).
6235.4[f] *6*	(13/2$^+$)	16[d] fs *8*	FGH KL N Q V	XREF: Others: AA, AB, AC, AD Jπ: (E2) to 9/2$^+$ and (M1+E2) to 11/2$^+$, band assignment.
6305.6 *6*	1/2$^+$		Jkl NOPQ V Z	XREF: Others: AA, AB, AC XREF: Z(6263). Jπ: L=0 in ^{22}Ne(d,n).
6354.2[g] *5*	9/2$^-$	21[d] fs *5*	FG Jkl N Q V	XREF: Others: AA, AB, AC, AD XREF: J(6340). Jπ: E2 to 5/2$^-$, band assignment.
6578.0 *6*	(9/2$^+$,5/2$^+$)	<11 fs	F jKl Q S V	XREF: Others: AC, AD Jπ: 5/2,9/2 from 6137γ angular correlation measurements (1972Li02) (p,αγ), M1+E2 to 7/2$^+$. 9/2$^+$,(5/2$^+$) in 1989Ba42 (p,γ).

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
6618.3 *8*	(7/2,5/2)$^+$	<0.7 fs	FG j l N Q V	XREF: Others: AB, AD XREF: AD(6602). Jπ: M1+E2 to 5/2$^+$, γ from (9/2$^+$) at 8319.5.
6735.5[‡] *2*	3/2$^+$	415[#] as *50*	F J L N Q S V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(^{3}He,d) and RUL.
6820.2 *8*	5/2$^-$	<8 fs	eF J N Q V	XREF: Others: AB, AD Jπ: L=3 in (^{6}Li,d), 5/2 from pγ(θ) (1989Ba42 − (p,γ)).
6867.7[‡] *2*	5/2$^+$,3/2$^+$	<6 fs	e k N Q V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(^{3}He,d).
6881.2 *11*			F	
6920.6[‡] *2*	3/2$^-$		Jkl NO Q V Z	XREF: Others: AB Jπ: L=1 in ^{22}Ne(^{3}He,d) and (d,^{3}He), γ to 5/2$^+$.
6947.4[‡] *2*	(3/2$^+$)	<28 fs	F l N Q S V	Jπ: L=(2) in ^{22}Ne(^{3}He,d), and γ′s to 1/2$^+$ and 1/2$^-$.
7055.3 *11*			F	
7070.8[‡] *2*			l N S V z	XREF: Others: AB, AD
7081.9[‡] *3*	3/2$^-$	258[#] as *31*	J l NO Q S V z	XREF: Others: AB Jπ: L=1 in ^{22}Ne(d,n) and ^{22}Ne(^{3}He,d) and γ to 5/2$^+$.
7125.8 *7*	(9/2)	13[#] fs *5*	F j Q S V	XREF: Others: AD Jπ: D+Q γ to 7/2$^+$. 5/2 and 7/2 are also possible. 9/2$^+$ in 2013Je04 (^{12}C,pγ).
7133.5[‡] *9*	3/2$^+$,5/2$^+$	200[#] as *26*	j N Q S V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(^{3}He,d) and γ′s to 1/2$^+$ and 7/2$^+$.
7150 *3*				XREF: Others: AB
7185.3 *6*	(9/2$^+$)		F J N Q V	XREF: Others: AB, AD Jπ: D+Q γ to 7/2$^+$. D+Q γ from 11/2$^+$ at 9210.4.
7268.1 *6*	13/2$^+$	18[d] fs *6*	FGH Kl q V	XREF: Others: AB, AD Jπ: E2 γ to 9/2$^+$, M1+E2 γ to 11/2$^+$.
7280.3[‡] *11*	5/2$^-$,7/2$^-$	9 fs *6*	F J l N q V	XREF: N(7277.1). Jπ: L=3 in (^{6}Li,d).
7385 *5*	1/2$^-$,3/2$^-$		G j Q	XREF: Others: AB, AD E(level),Jπ: From (d,α) and L=1 in ^{22}Ne(^{3}He,d).
7393.4 *7*	(11/2$^+$)	18[d] fs *11*	F j N V	XREF: Others: AB Jπ: (M1+E2) γ to 9/2$^+$. 7/2$^+$ and 9/2$^+$ are also possible.
7412.4[‡] *3*	5/2$^+$,7/2$^+$,9/2$^+$	<35 fs	G N Q V	XREF: Others: AB Jπ: γ cascades from resonance state (7/2$^-$) at 9396.4 → 7412 → 7/2$^+$ state at 2076 ((p,γ) − 1989Ba42)).
7451.5[‡] *9*	5/2$^+$,3/2$^+$	<3 fs	G k NO Q V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(^{3}He,d). L=(2) in (d,n).
7477.4 *11*			F jk	
7488.9 *7*	1/2$^-$,3/2$^-$	<3 fs	F j N Q V	XREF: Others: AB Jπ: L=1 in ^{22}Ne(^{3}He,d).
7563.9 *11*	(5/2)$^+$	0.26[#] fs *18*	F J L N Q S V	XREF: Others: AB

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
				Jπ: L=2 in (^{6}Li,d), D+Q γ from 7/2$^-$ at 9396.4.
7687.0 *7*			FG Jk Q V	XREF: Others: AB
7724.4[‡] *2*			Jk N Q V	XREF: Others: AB
7750.6 *11*	(5/2$^-$,3/2$^-$)		kL NO Q V	XREF: Others: AB Jπ: L=(2) in (d,n).
7835.7 *7*	7/2,(5/2$^+$)	<3.5 fs	FG Jk N Q V	XREF: Others: AB, AD Jπ: γ(θ) measurements for γ from 7/2 resonance state, γ to 9/2$^+$, D(+Q) γ to 5/2$^+$ (p,γ).
7872.6 *8*	3/2,(5/2$^+$)[b]	<3.5 fs	F L N V	XREF: Others: AB, AD XREF: L(7862). Jπ: D+Q γ to 5/2$^+$, γ to 1/2$^+$.
7876.2 *9*	5/2[b]	<12 fs	J N	
7891.2[‡] *3*	5/2$^+$	162[#] as *12*	J NO Q S V	T=3/2 Jπ: L=0 in (p,^{3}He) – 1969Ha38 (listed above in 'Other reactions') from 5/2$^+$ target; L=2 in ^{22}Ne(^{3}He,d).
7964 *3*			G N Q V	XREF: Others: AB, AD E(level): From (p,p′).
7974.0 *11*		<28[d] fs	FG J Q	XREF: Others: AB, AD
7991.5 *6*	(11/2)	19[#] fs *8*	F S V	Jπ: D+Q γ to 9/2$^+$ and (13/2$^+$) states. 11/2$^+$ in 2013Je04 (^{12}C,pγ).
8061 *3*	5/2$^+$,7/2,9/2$^+$		FG N Q V	XREF: Others: AB, AD E(level): From (p,p′). Jπ: γ's to 5/2$^+$ and 9/2$^+$.
8100 *9*			Q	XREF: Others: AB E(level): From (d,α).
8122[&] *7*			Q	XREF: Others: AB
8149[&] *5*			Q	XREF: Others: AB
8173[&] *7*			Q	XREF: Others: AB
8220[&] *5*			Q	XREF: Others: AB
8261.0[‡] *5*			N Q V	XREF: Others: AB XREF: Q(8254).
8301.6 *11*	5/2$^-$,7/2$^-$	<59[d] fs	eF kL NO Q V	Jπ: L=3 in ^{22}Ne(d,n).
8319.5 *9*			eF k V	XREF: Others: AB, AD XREF: V(8329)AD(8335). Jπ: 9/2$^+$ in 2013Je04 (^{12}C,pγ).
8360.0[‡] *9*			J N Q S V	XREF: Others: AB
8417.4[‡] *2*	3/2$^+$	<21 fs	NO Q V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(d,n), 3/2 from pγ(θ) (1989Ba42 – (p,γ)).
8432.6 *11*			F	
8475.7[‡] *5*	3/2$^+$,5/2$^+$		FG J L N Q V	XREF: Others: AB, AD XREF: F(8483)Q(8468). Jπ: L=2 in ^{22}Ne(^{3}He,d).
8503 *3*			Q V	XREF: Others: AB E(level): From (p,p′).
8558 *2*			L Q V	XREF: Others: AB, AD E(level): Weighted average of data from (^{3}He,d),(^{3}He,dγ), (d,α), and (p,p′).
8611.1[‡] *9*			N Q V	XREF: Others: AB, AD
8631.0[‡] *9*			F N S V	XREF: Others: AD

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
8651.2 *11*	1/2$^+$	0.53[#] fs *7*	FG J L Q S V	XREF: Others: AB Jπ: L=0 in ^{22}Ne(^{3}He,d).
8665.0 *18*	1/2$^+$	128 as *22*	NOPQ S V	T=(3/2) Jπ: L=0 in ^{22}Ne(^{3}He,d). T or Γ: Weighted average of data in (γ,γ′) and (d,nγ).
8721[#] *2*			F Q S V	XREF: Others: AB, AD XREF: AD(8705).
8798.7 *8*			FG l O Q V	XREF: Others: AB, AD Jπ: (3/2,7/2)$^+$ in (^{12}C,pγ). L=0 in (d,n) implies 1/2$^+$. γ rays to 5/2$^+$ and 5/2$^-$.
8820.8 *7*	(9/2$^-$)		FG J l V	XREF: Others: AB Jπ: L=5 in (^{6}Li,d) from 1/2$^+$ target, D+Q γ to 7/2$^+$.
8827.9 *11*	1/2$^+$	211[#] as *70*	F N PQ S	Jπ: L=0 in ^{22}Ne(^{3}He,d).
8862?	1/2$^+$		Q	Jπ: L=0 in ^{22}Ne(^{3}He,d).
8894?	1/2$^+$		Q	Jπ: L=0 in ^{22}Ne(^{3}He,d).
8945.1 *8*	(3/2$^+$)		F jK N	XREF: Others: AD Jπ: D+Q γ to 1/2$^+$. 2016De34 (p,γ) argue only 3/2$^+$ state was populated by low energy proton beam, as 7/2$^-$ state is strongly disfavored by the angular momentum barrier, considering the doublet at 8944 keV with tentative spin-parity of 3/2$^+$ and 7/2$^-$.
8946.8 *6*	(7/2$^-$)	21[d] fs *10*	F j O Q V	XREF: Others: AB Jπ: L=3 in ^{22}Ne(^{3}He,d). γ from (11/2$^-$) at 11271.9.
8963.9 *11*			F	
8975.3[‡] *7*	3/2$^+$,5/2$^+$		F Q V	XREF: Others: AB Jπ: L=2 in ^{22}Ne(^{3}He,d).
9000?			Q	
9039.5 *8*	(15/2)		FGH L v	XREF: Others: AB XREF: L(9024). Jπ: 2804γ D+Q to (13/2$^+$). 15/2$^+$ in 2013Je04 (^{12}C,pγ) and (^{16}O,αpγ).
9042.6 *8*	(7/2,9/2)$^+$	10[d] fs *5*	F N Q v	XREF: Others: AB, AD Jπ: From (^{12}C,pγ), γ to 5/2$^+$ and 7/2$^+$ states.
9072 *3*			V	XREF: Others: AB, AD E(level): From (p,p′).
9101.5 *7*	(13/2$^+$)		F jkl Q V	XREF: Others: AB Jπ: Q γ to 9/2$^+$, D+Q to (11/2$^+$).
9113 *3*			jkl V	
9172.8 *11*			FG Q V	XREF: Others: AB
9210.4 *6*	(11/2$^+$)		F j	XREF: Others: AD Jπ: D+Q γ to 9/2$^+$, γ to 7/2$^+$.
9211.0[‡] *8*	3/2$^-$	4.1[#] fs *15*	F j N Q S V Z	XREF: Others: AB XREF: F(9207)Z(9223). Jπ: L=1 in (d,^{3}He). D γ to 5/2$^+$.
9212.9[@] *11*			F	
9252.10[‡] *10*	1/2$^+$		N Q V	XREF: Q(9257). Jπ: L=0 in ^{22}Ne(^{3}He,d).
9285.4 *11*	3/2$^+$,5/2$^+$		F Q V	XREF: Others: AB, AD

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
				Jπ: L=2 in ^{22}Ne(^{3}He,d).
9292.7 *9*			F	Jπ: (7/2,11/2) and (11/2$^+$) in (^{12}C,pγ).
9325.8 *11*	(9/2$^+$,13/2$^+$)		F K Q V	XREF: Others: AB XREF: K(9.36E3). Jπ: From (dσ/dΩ) (θ) and DWBA calculations (α,p).
9396.4[‡] *3*	7/2$^-$		F N Q V	XREF: Others: AB, AD Jπ: pγ(θ) and from an acceptable fraction for the reduced proton width of the Wigner limit for a lp=3 capture (1989Ba42 – (p,γ)). D+Q γ's to 5/2$^-$ and 9/2$^-$.
9401.0 *7*			F N	XREF: Others: AB, AD
9404.8 *5*	1/2	65 eV	N	Jπ: From γ(θ) (1962Br21 – (p,γ)).
9426.1[‡] *5*	3/2$^-$		J N Q V Z	XREF: Others: AB Jπ: L=1 in (d,^{3}He), D+Q γ to 1/2$^+$ and 5/2$^+$.
9475 *4*			Q V	XREF: Others: AB E(level): Weighted average of data from (p,p′) and (^{3}He,d),(^{3}He,dγ).
9487.7[‡] *8*	3/2		N V	Jπ: From pγ(θ) (1973Me11 – (p,γ)).
9541.5 *12*	(13/2$^+$)		F Q V	XREF: Others: AB Jπ: D+Q γ to 11/2$^+$.
9582 *3*			Q V	XREF: Q(9588).
9608.2[‡] *2*	3/2$^+$	6 eV	N Q V	Jπ: L=2 in ^{22}Ne(^{3}He,d). γ to 5/2$^-$ and pγ(θ).
9626[#] *3*	1/2$^+$[a]	2.2[#] fs *8*	S V	XREF: Others: AB
9628.3[g] *9*	11/2$^-$	2.8[d] fs *14*	F	Jπ: D γ to 7/2$^-$, D+Q γ to 9/2$^-$ in (^{12}C,pγ), band assignment.
9652.2[‡] *10*	(3/2$^+$,5/2$^+$)		N q	Jπ: γ to 1/2$^+$ and 7/2$^+$.
9655.6[‡] *10*	(1/2$^+$)	105 eV	N q V	XREF: V(9651). Jπ: From (p,p′) (1968Ke11); 3/2,5/2 in 1973Me11 – (p,γ) from γ placement to 1/2$^+$ and 7/2$^+$.
9674.1[‡] *10*	3/2$^+$,5/2$^+$		N Q V	XREF: Others: AB Jπ: γ's to 1/2$^+$ and 7/2$^+$. D+Q γ's to 3/2$^+$ and 5/2$^+$.
9682.7[‡] *4*	(3/2$^+$)		N Q V	Jπ: 3/2 from pγ(θ) (1973Me11 – (p,γ)). D+Q γ's to 5/2$^+$. γ to 7/2$^+$.
9700.9[‡] *10*	3/2$^+$	29 eV	J NO Q V	Jπ: L=2 in ^{22}Ne(^{3}He,d). D+Q γ to 1/2$^-$ and γ to 7/2$^+$.
9732.53[‡] *13*	7/2		N Q V	XREF: Others: AB Jπ: D+Q to 5/2$^+$ and 9/2$^+$.
9738 *3*	1/2$^-$,3/2$^-$		V Z	XREF: Z(9728). Jπ: L=1 in (d,^{3}He).
9755.5[‡]	3/2$^+$		N Q V	Jπ: γ's to 1/2$^+$, 1/2$^-$, 5/2$^+$, 5/2$^-$.
9802.9[f] *8*	(15/2$^+$)	4.2[d] fs *14*	F H V	XREF: Others: AB Jπ: E2 to 11/2$^+$, (M1+E2) γ to (13/2$^+$), band assignment.
9815.7[‡] *4*	5/2$^+$		G J N Q V	XREF: G(9810). Jπ: γ's to 1/2$^+$ and 9/2$^+$. D+Q γ to 3/2$^+$.
9835.4[‡] *10*	3/2$^+$	47 eV	E N Q V	XREF: Q(9844). Jπ: L=2 in ^{22}Ne(^{3}He,d). 3/2$^+$ from (p,p′) (1968Ke11).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
9850.1[‡] *5*	1/2+[a]	150 eV	N V	Jπ: γ's to 1/2+, 1/2−, 5/2+.
9875.6 *9*			F V	
9890.9[‡] *6*	3/2		N Q V	Jπ: γ's to 1/2+, 1/2−, 5/2+, 5/2−.
9917.5 *11*	(3/2+,5/2,7/2+)		F N Q V	Jπ: γ's to 3/2+, 7/2+.
9924.3 *11*	(3/2,7/2)		F	Jπ: γ to 5/2+.
9939 *3*			k Q V	XREF: Q(9944).
9964.6 *12*	(9/2,13/2)		F k V	XREF: V(9958). Jπ: D+Q γ to 11/2+.
9988.2 *12*	11/2−		F V	XREF: V(9984). Jπ: Q γ to 7/2−.
10003.2[‡] *6*	1/2−[a]	475 eV	N V	
10017.4[‡] *10*	5/2+[a]	69 eV	G NO Q V	Jπ: L=2 in (d,n), γ's to 1/2+ and 9/2+.
10033.8 *9*			F j Q V	
10036.4 *11*			F j	
10049.1[‡] *6*			N	
10070.9[‡]	(5/2,7/2)		N V	Jπ: Proposed in 1979Sm02 (p,γ), based on γ(θ) measurements.
10075.9[‡] *5*	3/2,5/2		N Q	Jπ: γ's to 1/2− and 7/2+.
10085.3[‡] *5*	1/2+[a]	1270 eV	N V	Jπ: γ's to 1/2+ and 5/2+.
10114.8[‡] *5*	1/2+[a]	4200 eV	N V	Jπ: γ's to 1/2+, 3/2+, 3/2−.
10125.9[‡] *5*	5/2		N V	Jπ: γ's to 3/2+, 3/2−, 7/2+, 7/2−.
10156.4 *11*			F	
10164.2 *5*			N V	XREF: V(10160).
10169.6[‡] *2*	5/2+[a]	65 eV	N Q V	XREF: V(10173). Jπ: M1+E2 γ's to 3/2+ and 7/2+.
10183 *3*			V	
10212.9 *12*			F V	
10221 *3*			G Q V	E(level): From (p,p′).
10231.7[‡] *4*	5/2+[a]	4 eV	N V	Jπ: E1+M2 to 3/2− and 7/2−.
10237.8 *11*			F	
10243.7[‡] *14*	1/2+[a]	2450 eV	j N V	XREF: V(10250). Jπ: In 1968Ke11 (p,p′), based on measured σ(θ) mb/sr and fitting. L=0 (p,p′) (1967Ka10).
10281.5[‡] *6*	3/2+		j N V	XREF: V(10272). Jπ: γ's to 1/2− and 7/2+.
10296 *3*			V	
10318.0[‡] *6*	3/2−[a]	2000 eV	N V	XREF: V(10313).
10333.8 *11*			F V	
10338.7[‡] *7*	(1/2−)[a]	190 eV	N V	
10346.1[‡] *7*	5/2+		g N V	Jπ: γ's to 1/2+, 7/2+, 7/2−. In (p,p′) (1968Ke11) 3/2+,5/2+.
10353.8[‡] *7*	3/2+[a]	210 eV	g N V	Jπ: γ's to 1/2+, 1/2−, 7/2+.
10354.0[g] *7*	13/2−	<0.69 fs	F	Jπ: D γ to 11/2+, Q γ to 9/2−, and band assignment. T or Γ: From τ < 1 fs (2013Je04). Other: <18 fs (τ < 25 fs (1973Fr07)).
10404.8 *12*	(11/2−)		F V	Jπ: (D) γ to (13/2+).
10408.8 *11*			F	
10438.5 *11*	5/2+[a]	25 eV	F N V	Jπ: γ's to 3/2−, 3/2+, 7/2+. D+Q γ to 7/2+ and 3/2+.
10448.7 *12*			N V	XREF: V(10439).

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
10478.8[‡] *7*	3/2+[a]	470 eV	J N V	XREF: V(10472). Jπ: γ's to 1/2−, 1/2+, 5/2−, 5/2+.
10496 *3*			V	
10501.9[‡] *7*	3/2−[a]	920 eV	N V Z	XREF: Z(10490). Jπ: L=1 in (d,^{3}He); γ to 5/2+.
10507.8[‡] *7*	1/2+[a]	560 eV	N V	Jπ: γ's to 1/2+, 1/2−, 5/2+.
10519.1[‡] *7*	5/2+[a]	100 eV	N V	XREF: V(10514). Jπ: M1+E2 to 3/2+ and (5/2,7/2)+.
10534.1[‡] *7*			N V	XREF: V(10529).
10549.2[‡] *9*	5/2+[a]	540 eV	N V	XREF: V(10545).
10574.6[‡] *8*	3/2−[a]	1100 eV	N V	
10590.7 *7*	(13/2−)		FG V	Jπ: D γ to 11/2+, D+Q γ to (13/2+), γ to 9/2−.
10616.9[‡] *8*	5/2+,3/2+[a]	425 eV	N V	
10665 *3*			V	
10677 *3*	(3/2−)[a]	23 keV	V	
10698.0 *9*	(7/2,11/2)		F	Jπ: (D) γ to 9/2+, D+Q γ to 9/2−.
10701 *3*	(3/2−)[a]	400 eV	V	
10759.8 *12*			F	
10770 *3*	3/2+,5/2+[a]	<5 eV	V	
10798.0 *11*			F	
10824 *4*	(3/2+)[a]	1700 eV	V	
10826 *3*	(3/2−)[a]	26000 eV	V	
10838 *3*	3/2+,5/2+[a]	100 eV	O V	E(level): From (p,p′).
10860.9 *8*			F	
10869 *3*	(3/2−)[a]	21000 eV	V	
10903 *4*	(1/2−)[a]	53 eV	V	
10906.5 *40*	(1/2−)[a]	2850 eV	V	
10906.8 *40*	(5/2+)[a]	900 eV	V	
10918 *3*	(1/2+)[a]	55 eV	V	
10923.0 *11*			F	
10933 *3*	(3/2+)[a]	3500 eV	O V	XREF: O(10940).
10949 *4*	(1/2+)[a]	5200 eV	V	
10953 *4*	(7/2−)[a]	65 eV	V	
10967 *4*	(5/2+,3/2+)[a]	400 eV	V	
10973 *3*	(3/2+)[a]	18 eV	V	
10980 *3*	(3/2−)[a]	6000 eV	G V	E(level): From (p,p′).
10992 *4*	(1/2+)[a]	20600 eV	V	
10993 *4*	(3/2+)[a]	60 eV	V	
11004 *3*			V	
11041 *3*	(1/2+)[a]	500 eV	V	
11073.7[f] *10*	(17/2+)	34.7[d] fs *69*	F H	Jπ: (E2) γ to (13/2+), D+Q to (15/2), band assignment.
11088 *3*	(1/2−)[a]	800 eV	V	
11108 *4*	(5/2+)[a]	135 eV	V	
11112 *3*	(3/2)+[a]	4100 eV	V	Jπ: L=2 (p,p′) (1967Ka10).
11133 *3*			V	
11155 *3*			V	
11198 *4*	(3/2+)[a]	800 eV	V	
11240 *3*	(3/2−)[a]	12200 eV	V	
11250 *4*	(3/2+)[a]	20000 eV	V	

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
11266 *4*	(3/2$^-$)[a]	600 eV	V	
11271.9 *9*	(11/2$^-$)	12.5[d] fs *21*	F	Jπ: (E1) γ to 13/2$^+$.
11273 *4*	(3/2$^+$)[a]	1750 eV	V	
11276 *4*	(3/2$^+$)[a]	500 eV	V	
11279 *4*	(3/2$^+$)[a]	4000 eV	j O V	
11288 *3*	(1/2$^+$)[a]	11000 eV	G j V	E(level): From (p,p′).
11302 *4*	(3/2$^+$)[a]	300 eV	V	
11328 *4*	(1/2$^-$)[a]	80000 eV	V	
11333 *4*	(5/2$^+$)[a]	4000 eV	V	
11333.7 *40*	(3/2$^-$)[a]	2000 eV	V	
11335 *4*	(3/2$^+$)[a]	750 eV	V	
11350 *4*	(1/2$^-$)[a]	4000 eV	V	
11354 *4*	(1/2$^+$)[a]	13500 eV	V	
11424.7 *9*	(11/2)		F	Jπ: D γ to 13/2$^-$. (11/2$^+$) in (^{12}C,pγ).
11431 *3*	(1/2$^-$)[a]	35000 eV	V	
11495 *4*	(7/2$^-$)[a]	5500 eV	V	
11519 *4*	(5/2$^+$)[a]	3050 eV	j V	
11528 *3*	(5/2$^+$)[a]	6900 eV	j V	
11538 *4*	(5/2$^+$)[a]	130 eV	O V	E(level): From (p,p′).
11538.8 *9*	(15/2$^+$)		F	Jπ: γ to 11/2$^+$ and (13/2$^+$) states. Excitation energy.
11556 *3*	1/2$^+$[a]	3100 eV	G V	E(level): From (p,p′).
11580 *3*	(5/2$^+$)[a]	600 eV	G j V	
11612 *4*	(3/2$^-$)[a]	3200 eV	G j V	
11622 *3*			V	
11651.6 *9*	(13/2$^+$)		F	Jπ: γ to (9/2$^+$) and 11/2$^+$ states.
11664 *4*	(1/2$^-$,3/2$^-$)[a]	14000 eV	G V	E(level): From (p,p′).
11691 *4*	(1/2$^+$)[a]	1900 eV	G V	
11700 *4*	(3/2)$^-$[a]	7000 eV	G V	Jπ: L=1 (p,p′) (1967Ka10).
11708 *4*	(5/2$^+$)[a]	3200 eV	G V	
11.72×10^3 *2*	(13/2$^+$)		K	Jπ: From (dσ/dΩ) (θ) and DWBA calculations (α,p).
11747 *4*	(7/2$^-$)[a]	2300 eV	G O V	
11762 *4*	(1/2$^-$)[a]	15000 eV	G V	E(level): From (p,p′).
11820 *4*			V	
11840 *7*			V	
11865 *4*	(3/2)$^+$	16 keV	V	Jπ: L=2 (p,p′) (1967Ka10). Γ from (p,p′).
11897 *4*			V	
11.92×10^3 *3*			K O	XREF: O(11880).
11980 *4*			V	
12013.5 *11*			F V	XREF: V(12018).
12050			G	
12074 *4*			V	
12105 *4*		16 keV *2*	V	Γ from (p,p′).
12122 *5*		4 keV *2*	I K V	XREF: V(12129).
12184 *5*	(3/2)$^+$	12 kev 2	I V	Jπ: L=2 (p,p′) (1967Ka10). Γ from (p,p′).
12202 *5*		9 keV *4*	I V	Other: Γ=28 keV (p,p′).
12230 *10*			J	
12272 *5*		6 keV *3*	I K	
12290 *4*			V	
12317 *5*			G I V	XREF: G(12330).

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
12334?			V	
12351 *4*			V	
12378 *4*		11 keV	V	Γ from (p,p′).
12419.8 *2*	(7/2$^+$,5/2$^+$)	116 eV *20*	R V	Jπ: Based on measured Γ_{p0}/Γ_{p1} and shell model calculations (n,γ). Other: Γ=14 keV (p,p′) − discrepant value.
12453 *4*		9 keV	V	Γ from (p,p′).
12488 *5*	(13/2$^+$)	5 keV *2*	I K	Jπ: From (dσ/dΩ) (θ) and DWBA calculations (α,p).
12545 *5*		6[e] keV *3*	G I V	XREF: G(12540)V(12533).
12557?			V	
12593.1 *9*		<14[d] fs	F I V	XREF: I(12602)V(12584). Γ=34 keV (p,p′).
12625 *5*		25 keV	V	Γ from (p,p′).
12640 *5*		10 keV *5*	I	
12729 *5*		13 keV *2*	I V	Other: Γ=24 keV (p,p′).
12800 *5*		6 keV *3*	I k V	
12818 *5*		5[e] keV *2*	G I k	XREF: G(12820).
12848 *5*		11 keV *5*	I	
12852 *5*		9 keV *4*	I	
12927 *7*		6[e] keV *3*	G IJ	E(level): Unweighted average of data from (^{6}Li,d), (α,γ), and (^{15}N,α).
13050			G	
13074 *5*		12 keV *6*	I	
13110 *10*	(1/2$^+$)		E J	XREF: E(13150). Jπ: From (^{16}O,α) based on σ(θ).
13184 *5*		9 keV *4*	I	
13196 *5*		9 keV *4*	I	
13210			G	
13248 *5*		10[e] keV *5*	IJ	E(level): From (α,γ).
13279 *5*		14 keV *7*	I	
13337 *5*		8 keV *4*	I K	
13399 *5*		13 keV *6*	I	
13460 *5*		23 keV *11*	I	
13509 *5*		10 keV *5*	I	
13528 *5*			I	
13.56×10^3 *4*			K	
13.68×10^3 *3*			K	
13720			E G	XREF: E(13820).
13.97×10^3 *3*			K	
14080			G	
14240 *60*	(3/2$^+$)		E K	Jπ: From (^{16}O,α) based on σ(θ).
14370 *10*			G k O	E(level): From (d,n).
14440			G k	
14.65×10^3 *5*	(3/2$^+$)		E K	XREF: E(14700). Jπ: From (^{16}O,α) based on σ(θ).
14.77×10^3 *5*			K	
14.91×10^3 *5*			K	
14.99×10^3 *5*			G K	XREF: G(14980).
15.26×10^3 *5*			K	
15.52×10^3 *5*			G K	XREF: G(15450).
15.61×10^3 *5*			K	
15900			G	
15980			G	

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Adopted Levels, Gammas (continued)

^{23}Na Levels (continued)

E(level)[†]	Jπ	T or Γ[c]	XREF	Comments
16320			G	
16600			G	
19590.6 *21*	(5/2$^+$)	1.9 keV *8*	N	T=5/2 Jπ: Isobaric analogue state of ^{23}F g.s. (1985Ev01).
25400		0.67 MeV *20*	D	Γ from ^{7}Li(^{16}O,γ).

† From least-squares fit to γ-ray energies, except otherwise noted.
‡ From (p,γ).
# From (γ,γ′).
@ Might be the same level of 9211.0-keV. In (^{12}C,pγ) 2013Je04 tabulated this level (9212) based on 6230γ, while in (p,γ) by 2015De33 and earlier literature placed a comparable γ ray from 9211-keV level.
& From (^{3}He,d),(^{3}He,dγ).
a From (p,p′) (1968Ke11), based on measured σ(θ) mb/sr and fitting with single-level, Breit-Wigner formula for resonances <2.1 MeV and multilevel, multichannel R-matrix code for resonances above >2.1 MeV.
b From 1989Ba42 based on γ(θ) measurements, γ feeding from/to resonance levels/low lying levels, and RUL (for levels with measured/known lifetimes).
c From (p,γ), except where noted. Doppler shift attenuation method (DSAM). For weighted average, the listed uncertainty is the lowest input value. Γ data from (p,p′),(p,p′γ), except where otherwise noted.
d From (^{12}C,pγ).
e From (α,γ).
f Band(A): $K^\pi=1/2^+$ g.s. band.
g Band(B): $K^\pi=1/2^-$ band.

Adopted Levels, Gammas (continued)

$\gamma(^{23}Na)$

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
440.2	$5/2^+$	440.5 *6*	100	0.0	$3/2^+$	M1+E2	+0.065 *5*		B(M1)(W.u.)=0.225 *14*; B(E2)(W.u.)=32 *6* E_γ: Unweighted average of 439.80 *15* (^{12}C,pγ) and 441.1 *4* (p,p′γ)). δ: Weighted average of +0.08 *2* (1966Po06 − (p,$\alpha\gamma$)), +0.06 *4* (1968So07 − (p,p′γ)), +0.08 *3* (1970Po08 − (t,$\alpha\gamma$)), +0.05 *3* (1971Da14 − (t,$\alpha\gamma$)), 0.09 *1* (1972Li02 − (p,$\alpha\gamma$)), 0.045 *15* (1960Mi05 − (p,p′γ)), 0.09 *4* (1962Br21 − (p,γ)), and 0.060 *5* (1977Sc36).
2076.2	$7/2^+$	1636.6[#] *8*	100.00 *11*	440.2	$5/2^+$	M1+E2	+0.19 *1*	1.12×10^{-4}	α(K)=4.19×10^{-6} *6*; α(L)=2.51×10^{-7} *4*; α(M)=5.63×10^{-9} *8* α(IPF)=0.0001074 *16* B(M1)(W.u.)=0.164 *19*; B(E2)(W.u.)=14.6 *22* δ: Weighted average of +0.20 *2* (1966Po06 − (p,$\alpha\gamma$)), +0.24 *7* (1968So07 − (p,p′γ)), +0.18 *4* (1970Po08 − (t,$\alpha\gamma$)), +0.16 *2* (1971Da14 − (t,$\alpha\gamma$)), +0.22 *2* (1972Li02 − (p,$\alpha\gamma$)), and +0.18 *2* (1970Ma15 − (p,p′γ)).
		2076.7[#] *8*	9.77[c] *11*	0.0	$3/2^+$	E2		3.55×10^{-4}	B(E2)(W.u.)=12.2 *15* α(K)=3.18×10^{-6} *5*; α(L)=1.90×10^{-7} *3*; α(M)=4.26×10^{-9} *6* α(IPF)=0.000352 *5* Mult.,δ: From (p,$\alpha\gamma$). M3<7.3% from δ=−0.14 *14* (p,$\alpha\gamma$).
2390.9	$1/2^+$	1950.6[‡] *4*	52.2[c] *6*	440.2	$5/2^+$	E2		2.94×10^{-4}	α(K)=3.56×10^{-6} *5*; α(L)=2.13×10^{-7} *3*; α(M)=4.78×10^{-9} *7* α(IPF)=0.000290 *4* B(E2)(W.u.)=2.9 *7*
		2390.6[‡] *4*	100.0 *6*	0.0	$3/2^+$				
2640.5	$1/2^-$	2639.8[#] *8*	100	0.0	$3/2^+$	[E1]		1.05×10^{-3}	B(E1)(W.u.)=0.00060 *7* α(K)=1.426×10^{-6} *20*; α(L)=8.54×10^{-8} *12*; α(M)=1.91×10^{-9} *3* α(IPF)=0.001052 *15*
2703.8	$9/2^+$	627.4[#] *6*	59.8[@] *3*	2076.2	$7/2^+$	M1+E2	+0.10 *2*		B(M1)(W.u.)=0.38 *3*; B(E2)(W.u.)=6.E+1 *3* δ: From (p,$\alpha\gamma$).
		2263.3[#] *8*	100.0[@] *5*	440.2	$5/2^+$	E2		4.46×10^{-4}	α(K)=2.73×10^{-6} *4*; α(L)=1.637×10^{-7} *23*; α(M)=3.67×10^{-9} *6* α(IPF)=0.000443 *7* B(E2)(W.u.)=17.4 *14*
2982.0	$3/2^+$	591[@] *1*	0.51 *17*	2390.9	$1/2^+$	[M1]			B(M1)(W.u.)=0.10 *4* I_γ: Other value: 6.8 *23* (^{12}C,pγ).
		2541.3[#] *9*	70.1 *3*	440.2	$5/2^+$	M1+E2	−0.09 *3*	4.72×10^{-4}	α(K)=2.08×10^{-6} *3*; α(L)=1.244×10^{-7} *18*; α(M)=2.79×10^{-9} *4* α(IPF)=0.000470 *7* B(M1)(W.u.)=0.166 *21*; B(E2)(W.u.)=1.4 *10* δ: Weighted average of −0.09 *9* (1970Ma15 − (p,p′γ)), −0.07 *21* (1970Po08 − (t,$\alpha\gamma$)), −0.05 *7* (1971Da14 − (t,$\alpha\gamma$)), 0.05 *5* (1972Li02 − (p,$\alpha\gamma$)), and 0.15 *5* (1971Ra13 − (γ,γ'). I_γ: Other values: 77.3 *23* (^{12}C,pγ), 82 *4* (p,$\alpha\gamma$), 64 *3* (p,p′γ). Unweighted average of all available data: 72.8 *25*.

$^{23}_{11}Na_{12}$-14

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
2982.0	3/2$^+$	2981.7[#] *8*	100.0 *3*	0.0	3/2$^+$	M1		6.51×10^{-4}	α(K)=1.637×10^{-6} *23*; α(L)=9.81×10^{-8} *14*; α(M)=2.20×10^{-9} *3* α(IPF)=0.000650 *9* B(M1)(W.u.)=0.147 *18*
3677.9	3/2$^-$	696[@]	0.64 *13*	2982.0	3/2$^+$	[E1]			B(E1)(W.u.)=0.00058 *15*
		1037[#] *1*	24.9 *6*	2640.5	1/2$^-$	M1+E2	−0.14 *5*		B(M1)(W.u.)=0.18 *3*; B(E2)(W.u.)=21 *15* Mult.,δ: From (p,αγ) and weighted average of −0.11 *6* (t,α),(t,αγ) and −0.22 *10* (p,αγ).
		1287[#] *1*	1.65 *13*	2390.9	1/2$^+$	(E1)[@]		1.21×10^{-4}	B(E1)(W.u.)=0.00023 *4* α(K)=4.15×10^{-6} *6*; α(L)=2.49×10^{-7} *4*; α(M)=5.57×10^{-9} *8* α(IPF)=0.0001170 *18*
		3237.2[#] *9*	100.0 *8*	440.2	5/2$^+$	E1		1.36×10^{-3}	α(K)=1.099×10^{-6} *16*; α(L)=6.58×10^{-8} *10*; α(M)=1.475×10^{-9} *21* α(IPF)=0.001357 *19* B(E1)(W.u.)=0.00089 *13*
		3677.6	3.9 *13*	0.0	3/2$^+$	[E1]			B(E1)(W.u.)=2.4×10^{-5} *9* E_γ,I_γ: From (t,α),(t,αγ).
3847.9	5/2$^-$	170[@] *1*	0.72[@] *17*	3677.9	3/2$^-$				
		866[@] *1*	3.3 *3*	2982.0	3/2$^+$	(E1)[@]			B(E1)(W.u.)=0.00030 *8* I_γ: Other value: 0.89 *22* (^{12}C,pγ).
		1207[@] *1*	7.36 *16*	2640.5	1/2$^-$	(E2)[@]		2.06×10^{-5} *4*	B(E2)(W.u.)=29 *7* α(K)=9.52×10^{-6} *14*; α(L)=5.71×10^{-7} *8*; α(M)=1.278×10^{-8} *18* α(IPF)=1.054×10^{-5} *22* I_γ: Other value: 13 *4* (p,αγ).
		1772[@] *1*	100.0 *11*	2076.2	7/2$^+$	(E1)[@]		4.81×10^{-4}	α(K)=2.49×10^{-6} *4*; α(L)=1.490×10^{-7} *21*; α(M)=3.34×10^{-9} *5* α(IPF)=0.000478 *7* B(E1)(W.u.)=0.0011 *3*
		3408[@] *1*	15.5 *15*	440.2	5/2$^+$	E1+M2	−0.21 *14*	0.00140 *6*	α(K)=1.07×10^{-6} *6*; α(L)=6.4×10^{-8} *4*; α(M)=1.43×10^{-9} *8* α(IPF)=0.00140 *6* B(E1)(W.u.)=2.2×10^{-5} *6*; B(M2)(W.u.)=0.4 *+5−3* I_γ: Other value: 32 *9* (p,αγ). Mult.,δ: From (p,αγ).
		3848[@] *1*	37.5 *10*	0.0	3/2$^+$	(E1+M2)[@]		1.61×10^{-3} *3*	α(K)=8.96×10^{-7} *14*; α(L)=5.36×10^{-8} *9*; α(M)=1.202×10^{-9} *19* α(IPF)=0.001610 *25*

$^{23}_{11}Na_{12}$-15

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
3914.6	5/2$^+$	932[@] *1*	2.9 *3*	2982.0	3/2$^+$	[M1]			B(M1)(W.u.)=0.091 *21*
		1523[j@] *1*	1.38[j] *13*	2390.9	1/2$^+$	[E2]		1.03×10^{-4}	B(E2)(W.u.)=28 *7* α(K)=5.75×10^{-6} *8*; α(L)=3.45×10^{-7} *5*; α(M)=7.72×10^{-9} *11* α(IPF)=9.73×10^{-5} *15*
		1838[@] *1*	11.3 *3*	2076.2	7/2$^+$	M1		1.82×10^{-4}	α(K)=3.45×10^{-6} *6*; α(L)=2.07×10^{-7} *4*; α(M)=4.63×10^{-9} *8* α(IPF)=0.000180 *4* B(M1)(W.u.)=0.046 *10* Mult.: From (t,α),(t,αγ).
		3474[@] *1*	10.19 *13*	440.2	5/2$^+$				
		3914[@] *1*	100.0 *4*	0.0	3/2$^+$	M1+E2	+0.22 *3*	1.00×10^{-3} *2*	α(K)=1.116×10^{-6} *16*; α(L)=6.69×10^{-8} *10*; α(M)=1.498×10^{-9} *21* α(IPF)=0.001000 *15* B(M1)(W.u.)=0.040 *9*; B(E2)(W.u.)=0.8 *3* Mult.,δ: From (t,α),(t,αγ).
4429.63	1/2$^+$	2038.6	9.9 *3*	2390.9	1/2$^+$	[M1]		2.62×10^{-4}	α(K)=2.92×10^{-6} *4*; α(L)=1.748×10^{-7} *25*; α(M)=3.92×10^{-9} *6* α(IPF)=0.000259 *4* B(M1)(W.u.)=1.11 *12*
		4429.2	100 *3*	0.0	3/2$^+$	M1		1.16×10^{-3}	B(M1)(W.u.)=1.10 *12* α(K)=9.42×10^{-7} *14*; α(L)=5.64×10^{-8} *8*; α(M)=1.264×10^{-9} *18* α(IPF)=0.001161 *17* Mult.: From σ(E$_{e'}$) in (e,e′).
4775.2	7/2$^+$	860[@] *1*	8.0[@] *13*	3914.6	5/2$^+$				
		2072[@] *1*	28[@] *3*	2703.8	9/2$^+$				I_γ: Other value: 5.7 *15* (p,γ).
		2699[@] *1*	44.0 *18*	2076.2	7/2$^+$	M1		5.37×10^{-4}	α(K)=1.90×10^{-6} *3*; α(L)=1.136×10^{-7} *16*; α(M)=2.54×10^{-9} *4* α(IPF)=0.000535 *8* B(M1)(W.u.)>0.20 Mult.: From (t,α),(t,αγ).
		4335[@] *1*	100.0 *19*	440.2	5/2$^+$	M1+E2	+0.18 *2*	1.14×10^{-3}	α(K)=9.71×10^{-7} *14*; α(L)=5.81×10^{-8} *9*; α(M)=1.302×10^{-9} *19* α(IPF)=0.001134 *16* B(M1)(W.u.)>0.10; B(E2)(W.u.)>0.93 Mult.,δ: Weighted average of data from (p,αγ) and (t,α),(t,αγ).
5378.56	5/2$^+$	2396.4	12.4 *10*	2982.0	3/2$^+$				
		3302.1	36.0[c] *17*	2076.2	7/2$^+$	M1+E2	−0.19 *12*	7.79×10^{-4} *14*	B(M1)(W.u.)=0.95 *16* α(K)=1.416×10^{-6} *21*; α(L)=8.48×10^{-8} *12*; α(M)=1.90×10^{-9} *3* α(IPF)=0.000778 *14* δ: from 1970Po08 − (t,α),(t,αγ)).
		4937.8	100.0 *17*	440.2	5/2$^+$	M1+E2	−0.15 *4*	1.31×10^{-3}	B(M1)(W.u.)=0.72 *11*; B(E2)(W.u.)=5 *4* α(K)=8.16×10^{-7} *12*; α(L)=4.89×10^{-8} *7*; α(M)=1.095×10^{-9} *16*

$^{23}_{11}Na_{12}$-16

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
									α(IPF)=0.001309 *19* δ: Unweighted average of data from −0.27 *5* (p,αγ), −0.10 *7* (p,γ), and −0.16 *7* and −0.08 *4* in (t,α),(t,αγ). These values are for spin 5/2.
5378.56	5/2$^+$	5377.9	22.9[d] *13*	0.0	3/2$^+$	M1(+E2)	−0.02 *5*	1.43×10^{-3}	B(M1)(W.u.)=0.130 *21* α(K)=7.30×10^{-7} *11*; α(L)=4.37×10^{-8} *7*; α(M)=9.79×10^{-10} *14* α(IPF)=0.001426 *20* Mult.,δ: Weighted average of −0.05 *5* (p,αγ), −0.20 *9* (p,γ), and +0.04 *4* (t,α),(t,αγ). Note other possible values in later two data sets for spin 3/2.
5534.2	11/2$^+$	2830[@] *1*	100.0[@] *14*	2703.8	9/2$^+$	M1+E2	+0.17 *3*	5.93×10^{-4}	α(K)=1.771×10^{-6} *25*; α(L)=1.061×10^{-7} *15*; α(M)=2.38×10^{-9} *4* α(IPF)=0.000591 *9* B(M1)(W.u.)=0.07 *4*; B(E2)(W.u.)=1.7 *11* Mult.,δ: From (p,αγ).
		3458[@] *1*	27.5[@] *7*	2076.2	7/2$^+$	E2		9.76×10^{-4}	α(K)=1.385×10^{-6} *20*; α(L)=8.30×10^{-8} *12*; α(M)=1.86×10^{-9} *3* α(IPF)=0.000974 *14* B(E2)(W.u.)=6 *4* Mult.: From (^{12}C,pγ).
5741.0	5/2$^+$	5300.1	41[d] *5*	440.2	5/2$^+$	M1+E2	−0.19 *12*	1.41×10^{-3} *2*	B(M1)(W.u.)=0.105 *24*; B(E2)(W.u.)=0.9 *+11−8* α(K)=7.44×10^{-7} *11*; α(L)=4.46×10^{-8} *7*; α(M)=9.98×10^{-10} *14* α(IPF)=0.001413 *22* Mult.,δ: From (t,α),(t,αγ).
		5740.2	100.0 *19*	0.0	3/2$^+$	M1+E2	+0.19 *3*	1.52×10^{-3}	B(M1)(W.u.)=0.20 *3*; B(E2)(W.u.)=1.5 *5* α(K)=6.71×10^{-7} *10*; α(L)=4.02×10^{-8} *6*; α(M)=9.01×10^{-10} *13* α(IPF)=0.001523 *22* Mult.,δ: Weighted average of data from (p,αγ) and (p,γ).
5766.03	3/2$^+$	1918.0	2.9 *14*	3847.9	5/2$^-$	[E1]			B(E1)(W.u.)=0.34 *4*
		3125.3	8.6 *18*	2640.5	1/2$^-$	[E1]		1.30×10^{-3}	B(E1)(W.u.)=0.0029 *8* α(K)=1.148×10^{-6} *16*; α(L)=6.88×10^{-8} *10*; α(M)=1.541×10^{-9} *22* α(IPF)=0.001303 *19*
		3374.9	11.3 *19*	2390.9	1/2$^+$				E$_\gamma$,I$_\gamma$: From (γ,γ′).
		5325.2	82 *5*	440.2	5/2$^+$	M1		1.41×10^{-3}	B(M1)(W.u.)=0.174 *24* α(K)=7.39×10^{-7} *11*; α(L)=4.43×10^{-8} *7*; α(M)=9.92×10^{-10} *14* α(IPF)=0.001414 *20* I$_\gamma$: Weighted average of data from (p,γ) and (γ,γ′).
		5765.3	100 *6*	0.0	3/2$^+$	M1+E2	−0.09 *5*	1.53×10^{-3}	E$_\gamma$,I$_\gamma$: From (p,γ). B(M1)(W.u.)=0.169 *23*; B(E2)(W.u.)=0.25 *+34−20* α(K)=6.67×10^{-7} *10*; α(L)=4.00×10^{-8} *6*; α(M)=8.95×10^{-10} *13* α(IPF)=0.001524 *22* E$_\gamma$,I$_\gamma$,Mult.,δ: From (p,γ).

$^{23}_{11}Na_{12}$-17

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
5925.8	7/2$^+$	1151[@] *1*	3.53 *19*	4775.2	7/2$^+$	M1+E2		1.28×10^{-5} *23*	α(K)=9.1×10^{-6} *15*; α(L)=5.5×10^{-7} *9*; α(M)=1.23×10^{-8} *20* α(IPF)=3.1×10^{-6} *7* I_γ: Other: 6.5 *22* (^{12}C,pγ). Mult.: From (^{12}C,pγ).
		2010[@] *1*	12.5 *6*	3914.6	5/2$^+$	M1		2.51×10^{-4}	α(K)=2.98×10^{-6} *5*; α(L)=1.79×10^{-7} *3*; α(M)=4.00×10^{-9} *6* α(IPF)=0.000248 *4* B(M1)(W.u.)=0.014 *6* Mult.: From (^{12}C,pγ).
		3850[@] *1*	25.3 *24*	2076.2	7/2$^+$	M1+E2		0.00105 *8*	α(K)=1.16×10^{-6} *3*; α(L)=6.96×10^{-8} *17*; α(M)=1.56×10^{-9} *4* α(IPF)=0.00104 *8* I_γ: Other: 39 *4* (^{12}C,pγ). Mult.: From (^{12}C,pγ).
		5484[@] *1*	44.6 *17*	440.2	5/2$^+$	M1+E2	+4.4 *6*	1.61×10^{-3}	B(M1)(W.u.)=0.00012 *6*; B(E2)(W.u.)=0.51 *20* α(K)=7.25×10^{-7} *11*; α(L)=4.34×10^{-8} *6*; α(M)=9.73×10^{-10} *14* α(IPF)=0.001613 *23* I_γ: Other: 52.2 *22* (^{12}C,pγ). Mult.,δ: From (p,γ).
		5925[@] *1*	100 *2*	0.0	3/2$^+$	E2		1.73×10^{-3}	B(E2)(W.u.)=0.8 *4* α(K)=6.56×10^{-7} *10*; α(L)=3.93×10^{-8} *6*; α(M)=8.80×10^{-10} *13* α(IPF)=0.001731 *25* Mult.: From (p,γ).
5965.9	3/2$^-$	1536.2	10 *4*	4429.63	1/2$^+$				
		2288[@] *1*	30 *10*	3677.9	3/2$^-$				I_γ: Other: 100 *25* (^{12}C,pγ).
		3325[@] *1*	100 *20*	2640.5	1/2$^-$	(M1)		7.83×10^{-4}	α(K)=1.400×10^{-6} *20*; α(L)=8.38×10^{-8} *12*; α(M)=1.88×10^{-9} *3* α(IPF)=0.000782 *11* B(M1)(W.u.)>0.027 Mult.: From (^{12}C,pγ).
		3574.7	20 *10*	2390.9	1/2$^+$				
		5525.0	20 *8*	440.2	5/2$^+$	[E1]			B(E1)(W.u.)>4.5×10^{-5}
		5965.0	20 *8*	0.0	3/2$^+$				
6041.9	7/2$^-$	2127.2	5.7 *10*	3914.6	5/2$^+$	[E1]		7.33×10^{-4}	B(E1)(W.u.)=0.00040 *16* α(K)=1.91×10^{-6} *3*; α(L)=1.144×10^{-7} *16*; α(M)=2.56×10^{-9} *4* α(IPF)=0.000731 *11*
		2194[@] *1*	100 *4*	3847.9	5/2$^-$	M1+E2[h]	−0.13[h] *3*	3.27×10^{-4}	α(K)=2.60×10^{-6} *4*; α(L)=1.560×10^{-7} *22*; α(M)=3.49×10^{-9} *5*

$^{23}_{11}Na_{12}$-18

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
									α(IPF)=0.000325 *5* B(M1)(W.u.)=0.17 *6*; B(E2)(W.u.)=3.9 *22* I_γ: Other: 76.3 *26* (^{12}C,pγ).
6041.9	7/2$^-$	2364[@] *1*	25 *6*	3677.9	3/2$^-$	(E2)[@]		4.95×10^{-4}	α(K)=2.54×10^{-6} *4*; α(L)=1.519×10^{-7} *22*; α(M)=3.40×10^{-9} *5* α(IPF)=0.000493 *7* B(E2)(W.u.)=40 *17* I_γ: Other: 100 *5* (^{12}C,pγ).
		5601.0	74 *4*	440.2	5/2$^+$	E1+M2[h]	+0.17[h] *6*	0.00216 *4*	α(K)=5.83×10^{-7} *11*; α(L)=3.49×10^{-8} *6*; α(M)=7.82×10^{-10} *14* α(IPF)=0.00216 *4* B(E1)(W.u.)=0.00028 *10*; B(M2)(W.u.)=1.2 *9*
6115.1	(11/2)$^+$	3411[@] *1*	100.0[@] *9*	2703.8	9/2$^+$	M1[@]		8.16×10^{-4}	α(K)=1.354×10^{-6} *23*; α(L)=8.11×10^{-8} *14*; α(M)=1.82×10^{-9} *3* α(IPF)=0.00082 *3* B(M1)(W.u.)=0.012 *4*
		4038[@] *1*	30[@] *3*	2076.2	7/2$^+$	[E2]		1.18×10^{-3}	α(K)=1.105×10^{-6} *16*; α(L)=6.62×10^{-8} *10*; α(M)=1.482×10^{-9} *21* α(IPF)=0.001183 *17* B(E2)(W.u.)=0.89 *25*
6194.6	5/2$^-$	2346.6	94 *15*	3847.9	5/2$^-$				
		2516.6	100 *21*	3677.9	3/2$^-$				
		3553.8	68 *15*	2640.5	1/2$^-$				
		6193.7	32 *15*	0.0	3/2$^+$				
6235.4	(13/2$^+$)	701[@] *1*	12[@] *6*	5534.2	11/2$^+$	(M1)			B(M1)(W.u.)=0.4 *3* Mult.,δ: D+Q in (^{12}C,pγ). RUL yields to high B(E2)(W.u.) value for M1+E2 with δ=+1.05 *70* (^{12}C,pγ) and limits the δ<0.14.
		3531[@] *1*	100.0[@] *12*	2703.8	9/2$^+$	(E2)		1.00×10^{-3}	α(K)=1.343×10^{-6} *19*; α(L)=8.04×10^{-8} *12*; α(M)=1.80×10^{-9} *3* α(IPF)=0.001004 *14* B(E2)(W.u.)=15 *8* Mult.,δ: Q in (^{12}C,pγ) (2013Je04). However, D+Q earlier literature with δ=+1.6 *6* (p,αγ) (1972Li02) and +1.05 *70* (^{12}C,pγ) (1977Ke05) for 9/2$^+$; δ=−0.15 *14* (p,αγ) (1972Li02) and −0.03 *15* (^{12}C,pγ) (1977Ke05) for 13/2$^+$.
6305.6	1/2$^+$	3914.3[&] *5*	100	2390.9	1/2$^+$				
6354.2	9/2$^-$	312[@] *1*	0.65[@] *11*	6041.9	7/2$^-$				

$^{23}_{11}Na_{12}$-19

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
6354.2	9/2⁻	819[@] *1*	4.3[@] *11*	5534.2	11/2⁺	(E1)[@]			B(E1)(W.u.)=0.0017 *6*
		1579[@] *1*	19.6[@] *11*	4775.2	7/2⁺	(E1)[@]		3.33×10^{-4}	α(K)=2.97×10^{-6} *5*; α(L)=1.777×10^{-7} *25*; α(M)=3.98×10^{-9} *6* α(IPF)=0.000330 *5* B(E1)(W.u.)=0.0011 *3*
		2506[@] *1*	100.0[@] *11*	3847.9	5/2⁻	E2[@]		5.63×10^{-4}	α(K)=2.30×10^{-6} *4*; α(L)=1.377×10^{-7} *20*; α(M)=3.08×10^{-9} *5* α(IPF)=0.000560 *8* B(E2)(W.u.)=39 *10*
		3650[@] *1*	50.0[@] *11*	2703.8	9/2⁺	[E1]		1.54×10^{-3}	α(K)=9.48×10^{-7} *14*; α(L)=5.68×10^{-8} *8*; α(M)=1.272×10^{-9} *18* α(IPF)=0.001541 *22* B(E1)(W.u.)=0.00022 *6*
		4278[@] *1*	7.4[@] *2*	2076.2	7/2⁺	(E1)[@]		0.00179	α(K)=7.84×10^{-7} *11*; α(L)=4.70×10^{-8} *7*; α(M)=1.053×10^{-9} *15* α(IPF)=0.00179 *3* B(E1)(W.u.)=2.1×10^{-5} *5*
6578.0	(9/2⁺,5/2⁺)	2663[@] *1*	33 *7*	3914.6	5/2⁺				I_γ: Other: 20 *5* (^{12}C,pγ).
		3874[@] *1*	42 *9*	2703.8	9/2⁺				I_γ: Other: 25 *5* (^{12}C,pγ).
		4501[@] *1*	100[@] *10*	2076.2	7/2⁺	M1+E2[h]	−0.25[h] *10*	1.19×10^{-3} *2*	α(K)=9.23×10^{-7} *13*; α(L)=5.53×10^{-8} *8*; α(M)=1.239×10^{-9} *18* α(IPF)=0.001192 *19* B(M1)(W.u.)>0.0084; B(E2)(W.u.)>0.045 I_γ: Other: 80 *7* (p,αγ). δ: for 9/2 (p,γ) (1989Ba42).
		6137[@] *1*	58 *9*	440.2	5/2⁺				I_γ: Others: 100 *10* (^{12}C,pγ), 100 *9* (p,αγ).
6618.3	(7/2,5/2)⁺	1843.0	3.07 *11*	4775.2	7/2⁺				
		2703.5	1.21 *22*	3914.6	5/2⁺				
		4541.6	1.21 *22*	2076.2	7/2⁺				
		6177[@] *1*	100.0 *7*	440.2	5/2⁺	M1+E2[h]	+0.09[h] *1*		B(M1)(W.u.)>0.12; B(E2)(W.u.)>0.13 δ: δ for J(6618)=7/2 (1989Ba42) (p,γ).
		6617.3	4.2 *6*	0.0	3/2⁺				
6735.5	3/2⁺	3753.2	38 *10*	2982.0	3/2⁺				
		4658.8	71 *13*	2076.2	7/2⁺	[E2]		1.39×10^{-3}	B(E2)(W.u.)=43 *11* α(K)=9.04×10^{-7} *13*; α(L)=5.42×10^{-8} *8*; α(M)=1.214×10^{-9} *17* α(IPF)=0.001387 *20*
		6294.4	100 *13*	440.2	5/2⁺				

$^{23}_{11}Na_{12}$-20

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [b]	E_f	J_f^π	Mult. [g]	δ	α [i]	Comments
6820.2	5/2⁻	2973 [@] *1*	100 *11*	3847.9	5/2⁻	M1+E2 [h]	−0.29 [h] *9*	6.58×10^{-4} *11*	α(K)=1.652×10^{-6} *24*; α(L)=9.90×10^{-8} *15*; α(M)=2.22×10^{-9} *4* α(IPF)=0.000656 *11* B(M1)(W.u.)>0.055; B(E2)(W.u.)>1.6 I_γ: Other: 28 *4* (^{12}C,pγ).
		3141 [@] *1*	67 *11*	3677.9	3/2⁻				I_γ: Other: 100 *8* (^{12}C,pγ).
6867.7	5/2⁺,3/2⁺	6426.5	100 *4*	440.2	5/2⁺	D+Q [h]	+0.5 [h] *4*		δ: δ for J(6868)=5/2 (1989Ba42) (p,γ).
		6866.6	22 *4*	0.0	3/2⁺				
6881.2		4177 [@] *1*	100	2703.8	9/2⁺				
6920.6	3/2⁻	6479.4	43 *3*	440.2	5/2⁺				
		6919.5	100 *3*	0.0	3/2⁺				
6947.4	(3/2⁺)	3032.6	30 *5*	3914.6	5/2⁺				
		3965.0	100 *7*	2982.0	3/2⁺	D [h]			
		4306.5	26 *7*	2640.5	1/2⁻				
		4556.0	48 *7*	2390.9	1/2⁺				
		6506.2	61 *10*	440.2	5/2⁺				
		6946.3	55 *10*	0.0	3/2⁺				
7055.3		4351 [@] *1*	100	2703.8	9/2⁺				
7070.8		3156.0	8.9 [e] *10*	3914.6	5/2⁺				
		7069.6	100.0 *22*	0.0	3/2⁺				
7081.9	3/2⁻	4441.0	36 [a] *4*	2640.5	1/2⁻				
		6640.7	46 [a] *7*	440.2	5/2⁺	[E1]			B(E1)(W.u.)=0.0028 *5*
		7080.7	100 [a] *4*	0.0	3/2⁺	[E1]			B(E1)(W.u.)=0.0052 *6*
7125.8	(9/2)	2350 [@] *1*	14 [@] *4*	4775.2	7/2⁺				
		4422 [@] *1*	100 [@] *4*	2703.8	9/2⁺				
		5049 [@] *1*	74 [@] *4*	2076.2	7/2⁺	D+Q [@]			
		7125		0.0	3/2⁺				E_γ: From level energy difference, recoil corrected. Placement in (γ,γ′).
7133.5	3/2⁺,5/2⁺	4151.0	30 *5*	2982.0	3/2⁺				
		5056.7	30 *7*	2076.2	7/2⁺				
		6692.3	68 *5*	440.2	5/2⁺				
		7132.3	100 *5*	0.0	3/2⁺				
7185.3	(9/2⁺)	1259 [@] *1*	100 [@] *4*	5925.8	7/2⁺	D+Q [@]			
		4482 [@] *1*	91 [@] *9*	2703.8	9/2⁺				
		5108 [@] *1*	91 [@] *4*	2076.2	7/2⁺	D+Q [@]			
7268.1	13/2⁺	1033 [@] *1*	14 [@] *3*	6235.4	(13/2⁺)				
		1153 [@] *1*	84 [@] *3*	6115.1	(11/2)⁺	M1+E2 [@]		1.29×10^{-5} *23*	α(K)=9.1×10^{-6} *15*; α(L)=5.5×10^{-7} *9*; α(M)=1.22×10^{-8}

$^{23}_{11}Na_{12}$-21

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
									20 α(IPF)=3.3×10^{-6} *8*
7268.1	13/2$^+$	1734[@] *1*	35[@] *3*	5534.2	11/2$^+$	M1+E2[@]		1.68×10^{-4} *25*	α(K)=4.1×10^{-6} *4*; α(L)=2.47×10^{-7} *20*; α(M)=5.5×10^{-9} *5* α(IPF)=0.000164 *24*
		4564[@] *1*	100[@] *3*	2703.8	9/2$^+$	E2[@]		1.36×10^{-3}	B(E2)(W.u.)=1.8 *6* α(K)=9.31×10^{-7} *13*; α(L)=5.57×10^{-8} *8*; α(M)=1.249×10^{-9} *18* α(IPF)=0.001360 *19*
7280.3	5/2$^-$,7/2$^-$	3432.1	66 *8*	3847.9	5/2$^-$	M1+E2[h]	−0.2[h] *1*	8.29×10^{-4} *14*	B(M1)(W.u.)=0.023 *16*; B(E2)(W.u.)=0.5 *+7−4* α(K)=1.341×10^{-6} *19*; α(L)=8.03×10^{-8} *12*; α(M)=1.80×10^{-9} *3* α(IPF)=0.000828 *14* E_γ: Note calculated value in (p,γ) is 3428.8.
		6839[@] *1*	100 *8*	440.2	5/2$^+$	E1(+M2)[h]	+0.07[h] *6*		B(E1)(W.u.)=0.00017 *12*; B(M2)(W.u.)=0.08 *+16−7* E_γ: Note calculated value in (p,γ) is 6836.0.
7393.4	(11/2$^+$)	1859[@] *1*	9.8[@] *16*	5534.2	11/2$^+$				
		4689[@] *1*	100.0[@] *16*	2703.8	9/2$^+$	(M1+E2)[@]		0.00132 *8*	α(K)=8.85×10^{-7} *17*; α(L)=5.30×10^{-8} *11*; α(M)=1.187×10^{-9} *23* α(IPF)=0.00132 *8*
7412.4	5/2$^+$,7/2$^+$,9/2$^+$	3497.5	53 *13*	3914.6	5/2$^+$				
		5335.5	69 *11*	2076.2	7/2$^+$				
		6971.1	100 *11*	440.2	5/2$^+$				
7451.5	5/2$^+$,3/2$^+$	3603.3	8.3 *13*	3847.9	5/2$^-$				
		5060.0	3.3 *11*	2390.9	1/2$^+$				
		7010.2	100.0 *17*	440.2	5/2$^+$	M1+E2[h]	−0.8[h] *2*		B(M1)(W.u.)>0.0094; B(E2)(W.u.)>0.70
7477.4		7036[@] *1*	100	440.2	5/2$^+$				
7488.9	1/2$^-$,3/2$^-$	3811[@] *1*	100 *16*	3677.9	3/2$^-$				I_γ: Other: 96 *8* (^{12}C,pγ).
		4848[@] *1*	44 *11*	2640.5	1/2$^-$	D[@]			I_γ: Other: 13 *4* (^{12}C,pγ).
		5097[@] *1*	78 *13*	2390.9	1/2$^+$	D[@]			I_γ: Other: 100 *4* (^{12}C,pγ).
7563.9	(5/2)$^+$	5487[@] *1*		2076.2	7/2$^+$				
		7122.5	43 *21*	440.2	5/2$^+$				
		7562.6	100 *21*	0.0	3/2$^+$				
7687.0		2911[@] *1*	83[@] *17*	4775.2	7/2$^+$				
		4983[@] *1*	100[@] *17*	2703.8	9/2$^+$	D+Q[@]			
7724.4		4741.9	33 *7*	2982.0	3/2$^+$				
		7723.0	100 *7*	0.0	3/2$^+$				

$^{23}_{11}Na_{12}$-22

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	Comments
7750.6	(5/2$^-$,3/2$^-$)	4768[@] *1*	100 *4*	2982.0	3/2$^+$			
		7309.2	100 *4*	440.2	5/2$^+$			
7835.7	7/2,(5/2$^+$)	3920[@] *1*	34 *10*	3914.6	5/2$^+$			
		5131[@] *1*	38 *12*	2703.8	9/2$^+$			
		7394.2	100 *16*	440.2	5/2$^+$	D(+Q)[h]	−0.07[h] *7*	
7872.6	3/2,(5/2$^+$)	4890[@] *1*	57 *14*	2982.0	3/2$^+$			I_γ: Other: 22 *11* (^{12}C,pγ).
		5481[@] *1*	37 *9*	2390.9	1/2$^+$			I_γ: Other: 100 *11* (^{12}C,pγ).
		7431.1	100 *14*	440.2	5/2$^+$	D+Q[h]	−0.8[h] *6*	
7876.2	5/2	4027.9	51 *9*	3847.9	5/2$^-$			
		4197.9	57 *11*	3677.9	3/2$^-$			
		7874.8	100 *6*	0.0	3/2$^+$			
7891.2	5/2$^+$	5814.2	10.3[a] *17*	2076.2	7/2$^+$			
		7449.7	43 *3*	440.2	5/2$^+$	M1[h]	[h]	B(M1)(W.u.)=0.113 *11* I_γ: Other: 62 *3* (γ,γ′).
		7889.8	100 *3*	0.0	3/2$^+$	M1+E2[h]	−0.06[h] *4*	B(M1)(W.u.)=0.194 *15*
7964		5887	87 *16*	2076.2	7/2$^+$			
		7523	100 *18*	440.2	5/2$^+$			
7974.0		5897[@] *1*	100	2076.2	7/2$^+$			
7991.5	(11/2)	1756[@] *1*	16.7[@] *24*	6235.4	(13/2$^+$)	D+Q[@]		
		2457[@] *1*	40[@] *5*	5534.2	11/2$^+$			
		5287[@] *1*	100.0[@] *24*	2703.8	9/2$^+$	D+Q[@]		
8061	5/2$^+$,7/2,9/2$^+$	5357	100 *40*	2703.8	9/2$^+$			
		7619	100 *40*	440.2	5/2$^+$			
8301.6	5/2$^-$,7/2$^-$	7860[@] *1*	100	440.2	5/2$^+$			
8319.5		1701[@] *1*	10[@] *3*	6618.3	(7/2,5/2)$^+$			
		5615[@] *1*	100[@] *11*	2703.8	9/2$^+$	Q[@]		
8360.0		5968.3	13[a] *3*	2390.9	1/2$^+$			
		7918.3	28.2[a] *14*	440.2	5/2$^+$			
		8358.4	100[a] *4*	0.0	3/2$^+$			
8417.4	3/2$^+$	5434.7	41 *14*	2982.0	3/2$^+$			
		6025.7	100 *14*	2390.9	1/2$^+$			
		8415.8	41 *14*	0.0	3/2$^+$			
8432.6		5728[@] *1*	100	2703.8	9/2$^+$			
8475.7	3/2$^+$,5/2$^+$	8034.0	100	440.2	5/2$^+$			
8631.0		8629.3	100	0.0	3/2$^+$			
8651.2	1/2$^+$	4736[@] *1*		3914.6	5/2$^+$			

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	Comments
8651.2	1/2$^+$	8649.5		0.0	3/2$^+$		
8665.0	1/2$^+$	5678[&] *4*	5[&] *2*	2982.0	3/2$^+$		
		6024[&] *3*	8[&] *4*	2640.5	1/2$^-$	[E1]	B(E1)(W.u.)=0.0020 *11*
		6272[&] *4*	6[&] *4*	2390.9	1/2$^+$	[M1]	B(M1)(W.u.)=0.035 *24*
		8666[&] *3*	100[&] *2*	0.0	3/2$^+$		
8721		8719[k]	100	0.0	3/2$^+$		
8798.7		4950[@] *1*	11[@] *3*	3847.9	5/2$^-$		
		8357[@] *1*	100[@] *7*	440.2	5/2$^+$	D+Q[@]	
8820.8	(9/2$^-$)	984[@] *1*	9[@] *3*	7835.7	7/2,(5/2$^+$)		
		2780[@] *1*	42[@] *3*	6041.9	7/2$^-$		
		4047[@] *1*	100[@] *6*	4775.2	7/2$^+$	D+Q[@]	
		6114[@] *1*	82[@] *6*	2703.8	9/2$^+$		
8827.9	1/2$^+$	6436[@] *1*	100[&] *16*	2390.9	1/2$^+$	[M1]	B(M1)(W.u.)=0.25 *10*
		8826.1	56[&] *16*	0.0	3/2$^+$		
8945.1	(3/2$^+$)	5030[@] *1*	100 *5*	3914.6	5/2$^+$		
		6553[@] *1*	30 *5*	2390.9	1/2$^+$	D+Q[@]	I_γ: Other: 65 *10* (^{12}C,pγ).
8946.8	(7/2$^-$)	1821[@] *1*	67[@] *4*	7125.8	(9/2)	D[@]	
		2592[@] *1*	21[@] *4*	6354.2	9/2$^-$		
		6240[@] *1*	100[@] *8*	2703.8	9/2$^+$	D[@]	
		6872[@] *1*	25[@] *4*	2076.2	7/2$^+$		
8963.9		8522[@] *1*	100	440.2	5/2$^+$		
8975.3	3/2$^+$,5/2$^+$	2357.1	8.0 *16*	6618.3	(7/2,5/2)$^+$		
		4200.3	4.1 *5*	4775.2	7/2$^+$		
		5060.5	4.6 *14*	3914.6	5/2$^+$		
		5297.0	6.0 *9*	3677.9	3/2$^-$		
		5992.4	8.7 *9*	2982.0	3/2$^+$		E_γ: Other value: 5990 (^{12}C,pγ), yields a level energy of 8972.9 *11* in least-squares fit, if ΔE=1 keV.
		6898.2	100 *3*	2076.2	7/2$^+$		
		8533.6	90.8 *16*	440.2	5/2$^+$		
		8973.4	13 *3*	0.0	3/2$^+$		
9039.5	(15/2)	1771[@] *1*	16[@] *6*	7268.1	13/2$^+$		
		2804[@] *1*	100[@] *6*	6235.4	(13/2$^+$)	D+Q[@]	
		3505[@] *1*	16[@] *3*	5534.2	11/2$^+$		
9042.6	(7/2,9/2)$^+$	2222	4.9 *4*	6820.2	5/2$^-$		
		2687	3.3 *4*	6354.2	9/2$^-$		

$^{23}_{11}Na_{12}$-24

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	Comments
9042.6	(7/2,9/2)$^+$	3000	5.7 *4*	6041.9	7/2$^-$		
		3115	7.9 *4*	5925.8	7/2$^+$		
		5128	4.0 *9*	3914.6	5/2$^+$		
		5194	29.3 *11*	3847.9	5/2$^-$		
		6337	24.0 *11*	2703.8	9/2$^+$		
		6965[@] *1*	41.2 *13*	2076.2	7/2$^+$		I_γ: Other value: 100 *5* (^{12}C,pγ).
		8601[@] *1*	100.0 *20*	440.2	5/2$^+$		I_γ: Other value: 20 *5* (^{12}C,pγ).
9101.5	(13/2$^+$)	1110[@] *1*	40[@] *10*	7991.5	(11/2)	D+Q[@]	
		1708[@] *1*	90[@] *10*	7393.4	(11/2$^+$)	D+Q[@]	
		2866[@] *1*	80[@] *10*	6235.4	(13/2$^+$)		
		2986[@] *1*	90[@] *10*	6115.1	(11/2)$^+$		
		6397[@] *1*	100[@] *20*	2703.8	9/2$^+$	Q[@]	
9172.8		6468[@] *1*	100	2703.8	9/2$^+$		
9210.4	(11/2$^+$)	1523[j@] *1*	2.1[j@] *3*	7687.0			
		1817[@] *1*	2.55[@] *20*	7393.4	(11/2$^+$)		
		1943[@] *1*	5.9[@] *20*	7268.1	13/2$^+$		
		2025[@] *1*	100[@] *6*	7185.3	(9/2$^+$)	D+Q[@]	
		2632[@] *1*	11.8[@] *20*	6578.0	(9/2$^+$,5/2$^+$)		
		3095[@] *1*	35[@] *4*	6115.1	(11/2)$^+$		
		3284[@] *1*	13.7[@] *20*	5925.8	7/2$^+$		
9211.0	3/2$^-$	1338	2.0 *4*	7872.6	3/2,(5/2$^+$)		
		1723	4.8 *5*	7488.9	1/2$^-$,3/2$^-$		
		2129	12.6 *9*	7081.9	3/2$^-$		
		2290	5.6 *6*	6920.6	3/2$^-$		
		2343	8.3 *8*	6867.7	5/2$^+$,3/2$^+$		
		2903	10.3 *7*	6305.6	1/2$^+$		
		3016	12.3 *9*	6194.6	5/2$^-$		
		3247	76 *4*	5965.9	3/2$^-$		
		3469	8.6 *7*	5741.0	5/2$^+$		
		4781	13.9 *9*	4429.63	1/2$^+$		
		5297	100 *5*	3914.6	5/2$^+$	D[@]	E_γ: Other value: 5292 (^{12}C,pγ) (uncertainty of 1 keV is an estimate – might be higher) yields level energy of 9207.1 keV, however authors (2013Je04) attribution of 5292γ from 9211-keV level indicate that 9207 and 9211 keV levels are same. Mult.: From (^{12}C,pγ).
		5363	11.0 *8*	3847.9	5/2$^-$		
		5533	5.5 *7*	3677.9	3/2$^-$		

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	Comments
9211.0	3/2$^-$	6571	14.6 *10*	2640.5	1/2$^-$			
		6820	6.5 *6*	2390.9	1/2$^+$			
		7135[k]	5.7 *5*	2076.2	7/2$^+$			E_γ: γ-ray branch to 2076.2-keV level reported in 2017Ke01 (p,γ), adopted spin-parity 7/2$^+$ for 2076.2 keV level implies an (M2) transition. Placement should be considered with caution.
		8771	13.0 *9*	440.2	5/2$^+$			
		9211	13.9 *10*	0.0	3/2$^+$			
9212.9		6230[@] *1*	100	2982.0	3/2$^+$			E_γ: Comparable γ-ray placed from 9211-keV level in (p,γ). See footnote for 9212.9-keV level.
9252.10	1/2$^+$	2170	4.93 *22*	7081.9	3/2$^-$			
		2331.4	5.81 *22*	6920.6	3/2$^-$			
		3485.8	6.65 *22*	5766.03	3/2$^+$			
		4821.9	4.04 *22*	4429.63	1/2$^+$			
		5336.8	0.89 *22*	3914.6	5/2$^+$			
		5573.5	11.6 *4*	3677.9	3/2$^-$			
		6269.2	75.8 *12*	2982.0	3/2$^+$			
		6611.0	19.8 *4*	2640.5	1/2$^-$			
		6860.1	9.7 *3*	2390.9	1/2$^+$			
		9250.1	100.0 *17*	0.0	3/2$^+$			
9285.4	3/2$^+$,5/2$^+$	7208[@] *1*	100	2076.2	7/2$^+$			
9292.7		2674[@] *1*	2.9[@] *7*	6618.3	(7/2,5/2)$^+$			
		6588[@] *1*	100[@] *14*	2703.8	9/2$^+$			
9325.8	(9/2$^+$,13/2$^+$)	6621[@] *1*	100	2703.8	9/2$^+$			
9396.4	7/2$^-$	978.9	0.83	8417.4	3/2$^+$			
		1520.1	92	7876.2	5/2	D+Q[h]	+0.08[h] *7*	
		1645.8	11	7750.6	(5/2$^-$,3/2$^-$)			
		1830.1	13	7563.9	(5/2)$^+$	D+Q[h]	+0.13[h] *7*	
		1944.8	8.3	7451.5	5/2$^+$,3/2$^+$			
		1983.9	42	7412.4	5/2$^+$,7/2$^+$,9/2$^+$	D+Q[h]	[h]	
		2116.1	83	7280.3	5/2$^-$,7/2$^-$	D(+Q)	−0.04 *6*	
		2211.7	17	7185.3	(9/2$^+$)			
		2576.6	100	6820.2	5/2$^-$	D+Q	+0.06 *2*	
		2818.4	37	6578.0	(9/2$^+$,5/2$^+$)			
		3041.7	17	6354.2	9/2$^-$	D+Q	+0.24 *7*	
		3201.6	62	6194.6	5/2$^-$	D+Q	−0.11 *2*	
		3353.9	81	6041.9	7/2$^-$	D+Q	+0.03 *6*	
		3654.3	83	5741.0	5/2$^+$	D(+Q)	+0.02 *2*	
		4621.3	5.8	4775.2	7/2$^+$			

$^{23}_{11}Na_{12}$-26

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	Comments
9396.4	7/2$^-$	5481.5	23	3914.6	5/2$^+$			
		5547.6	100	3847.9	5/2$^-$	D(+Q)	+0.02 *2*	
		6691.9	39	2703.8	9/2$^+$			
		8954.5[@]	25	440.2	5/2$^+$	D+Q[h]	+2.6[h] *7*	E_γ: Consideration of 8957 *1* from (^{12}C,pγ) in least squares fit yields level energy of 9399.1 *11*, significantly different than literature values. Evaluators adopted level energy from (p,γ).
9401.0		5486[@] *1*	50[@] *25*	3914.6	5/2$^+$			
		5722[@] *1*	100[@] *25*	3677.9	3/2$^-$			
		6418[@] *1*	18[@] *5*	2982.0	3/2$^+$			
9404.8	1/2	1680.3	0.58 *4*	7724.4				
		3638.5	0.54 *4*	5766.03	3/2$^+$			
		4974.6	4.47 *13*	4429.63	1/2$^+$			
		5726.1	10.0 *3*	3677.9	3/2$^-$			
		6421.8	10.3 *5*	2982.0	3/2$^+$			
		6763.2	3.82 *13*	2640.5	1/2$^-$			
		8962.7	1.97 *13*	440.2	5/2$^+$			
		9402.7	100.0 *9*	0.0	3/2$^+$			
9426.1	3/2$^-$	1937.1		7488.9	1/2$^-$,3/2$^-$	D+Q[h]	+0.098[h] *9*	
		2344.1		7081.9	3/2$^-$	D(+Q)[h]	+0.11[h] *15*	
		2605.7		6820.2	5/2$^-$	D+Q[h]	+0.18[h] *4*	δ: or <−8.
		2690.4		6735.5	3/2$^+$	D(+Q)[h]	+0.04[h] *5*	
		3120.3		6305.6	1/2$^+$	D(+Q)[h]	−0.01[h] *3*	δ: or −1.7 *2*.
		3459.9		5965.9	3/2$^-$	D(+Q)[h]	+0.01[h] *5*	
		3659.8		5766.03	3/2$^+$	D+Q[h]	−0.18[h] *6*	
		4995.9		4429.63	1/2$^+$	D(+Q)[h]	+0.005[h] *10*	
		5510.8		3914.6	5/2$^+$	D+Q[h]	−0.07[h] *2*	
		5577.5		3847.9	5/2$^-$	D+Q[h]	−0.28[h] *2*	
		6784.5		2640.5	1/2$^-$	D+Q[h]	+0.25[h] *4*	
		7034.0		2390.9	1/2$^+$	D+Q[h]	+0.022[h] *4*	
		8984.0		440.2	5/2$^+$	D+Q[h]	+0.40[h] *5*	δ: or +6 *2*.
		9424.0		0.0	3/2$^+$	D+Q[h]	+0.35[h] *3*	δ: or +1.5 *2*.
9487.7	3/2	3181.9	4.4	6305.6	1/2$^+$			
		3292.9	1.4	6194.6	5/2$^-$			
		3521.5	3.1	5965.9	3/2$^-$			
		3721.3	5.6	5766.03	3/2$^+$			
		4108.7	3.3	5378.56	5/2$^+$			
		5057.5	5.8	4429.63	1/2$^+$			

$^{23}_{11}Na_{12}$-27

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
9487.7	3/2	5572.4	9.2	3914.6	5/2$^+$				
		5809.0	2.5	3677.9	3/2$^-$				
		6504.7	6.9	2982.0	3/2$^+$				
		6846.1	50	2640.5	1/2$^-$				
		7095.6	2.2	2390.9	1/2$^+$				
		9045.6	100	440.2	5/2$^+$	D+Q[h]	−1.2[h] *+2−8*		
		9485.6	83	0.0	3/2$^+$	D+Q[h]	+0.36[h] *10*		δ: or +1.7 *5*.
9541.5	(13/2$^+$)	4007[@] *1*	100	5534.2	11/2$^+$	D+Q[@]			
9608.2	3/2$^+$	1735.5	0.7	7872.6	3/2,(5/2$^+$)				
		1883.7	1.2	7724.4					
		2119.2	1.4	7488.9	1/2$^-$,3/2$^-$				
		2214.7	0.2	7393.4	(11/2$^+$)				
		2537.2	1.6	7070.8					
		2660.6	2.8	6947.4	(3/2$^+$)				
		2787.8	0.9	6820.2	5/2$^-$				
		2872.5	0.5	6735.5	3/2$^+$				
		3302.4	0.5	6305.6	1/2$^+$				
		3642.0	0.2	5965.9	3/2$^-$				
		3841.8	1.4	5766.03	3/2$^+$				
		3866.8	5.1	5741.0	5/2$^+$	D+Q[h]	−0.38[h] *14*		
		4229.2	2.1	5378.56	5/2$^+$				
		5177.9	1.2	4429.63	1/2$^+$				
		5692.8	42	3914.6	5/2$^+$	D+Q[h]	+0.13[h] *4*		
		5759.5	4.2	3847.9	5/2$^-$				
		6625.2	4.2	2982.0	3/2$^+$				
		6966.6	4.2	2640.5	1/2$^-$				
		7216.1	1.9	2390.9	1/2$^+$	D+Q[h]	+0.20[h] *2*		
		9166.0	100	440.2	5/2$^+$	D+Q[h]	+0.32[h] *4*		
		9606.1	56	0.0	3/2$^+$	D+Q[h]	+0.40[h] *10*		
9626	1/2$^+$	9624	100	0.0	3/2$^+$				
9628.3	11/2$^-$	3274[@] *1*	100[@] *9*	6354.2	9/2$^-$	(M1+E2)[@]		0.00083 *7*	α(K)=1.47×10^{-6} *5*; α(L)=8.8×10^{-8} *3*; α(M)=1.97×10^{-9} *6* α(IPF)=0.00083 *7*
		3586[@] *1*	71[@] *6*	6041.9	7/2$^-$	(E2)[@]		1.03×10^{-3}	B(E2)(W.u.)=36 *19* α(K)=1.313×10^{-6} *19*; α(L)=7.86×10^{-8} *11*; α(M)=1.761×10^{-9} *25* α(IPF)=0.001025 *15*
9652.2	(3/2$^+$,5/2$^+$)	2784.3	3.3	6867.7	5/2$^+$,3/2$^+$				
		4876.4	41	4775.2	7/2$^+$				

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	Comments
9652.2	(3/2$^+$,5/2$^+$)	5736.8	2.2	3914.6	5/2$^+$			
		5803.5	1.5	3847.9	5/2$^-$			
		5973.5	6.5	3677.9	3/2$^-$			
		7260.1	1.7	2390.9	1/2$^+$			
		7574.7	2.2	2076.2	7/2$^+$			
		9210.0	100	440.2	5/2$^+$			
		9650.0	59	0.0	3/2$^+$			
9655.6	(1/2$^+$)	4879.8[k]	11	4775.2	7/2$^+$			E_γ: Placement from 1973Me11 (p,γ), consider with caution − ΔJ=3, if J^π=(1/2$^+$).
		5225.3	2.7	4429.63	1/2$^+$			
		5740.2	1.4	3914.6	5/2$^+$			
		5976.9	64	3677.9	3/2$^-$			
		6672.6	1.8	2982.0	3/2$^+$			
		7014.0	8.6	2640.5	1/2$^-$			
		7263.5	1.4	2390.9	1/2$^+$			
		9213.4	36	440.2	5/2$^+$			
		9653.4	100	0.0	3/2$^+$			
9674.1	3/2$^+$,5/2$^+$	1782.8	3.6	7891.2	5/2$^+$			
		2806.2	28	6867.7	5/2$^+$,3/2$^+$			
		3479.2	6.1	6194.6	5/2$^-$			
		3907.7	9.7	5766.03	3/2$^+$			
		5758.7	21	3914.6	5/2$^+$			
		5825.4	3.9	3847.9	5/2$^-$			
		5995.4	9.7	3677.9	3/2$^-$			
		6691.0	21	2982.0	3/2$^+$			
		7282.0	3.0	2390.9	1/2$^+$			
		7596.6	58	2076.2	7/2$^+$			
		9231.9	100	440.2	5/2$^+$	D+Q[h]	−0.11[h] *7*	δ: or −2.1 *12*.
		9671.9	39	0.0	3/2$^+$	D+Q[h]	−3.7[h] *5*	
9682.7	(3/2$^+$)	1381.0	1.8	8301.6	5/2$^-$,7/2$^-$			
		2118.7	21	7563.9	(5/2)$^+$			
		2231.1	16	7451.5	5/2$^+$,3/2$^+$			
		2600.6	8.9	7081.9	3/2$^-$			
		4906.9	13	4775.2	7/2$^+$			
		5767.3	11	3914.6	5/2$^+$			
		5834.0	89	3847.9	5/2$^-$			
		6003.9	30	3677.9	3/2$^-$			
		6699.6	54	2982.0	3/2$^+$			
		7605.2	5.0	2076.2	7/2$^+$			
		9240.5	8.6	440.2	5/2$^+$	D(+Q)[h]	−1.2[h] *+15−11*	

$^{23}_{11}Na_{12}$-29

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ †	I_γ [b]	E_f	J_f^π	Mult.[g]	δ	Comments
9682.7	(3/2$^+$)	9680.5	100	0.0	3/2$^+$	D+Q[h]	−0.36[h] *10*	δ: or −5.7 *+57−20*.
9700.9	3/2$^+$	1809.6	0.6	7891.2	5/2$^+$			
		1950.2	0.6	7750.6	(5/2$^-$,3/2$^-$)			
		1976.4	0.4	7724.4				
		2965.2	0.8	6735.5	3/2$^+$			
		3959.5	4.0	5741.0	5/2$^+$			
		5270.6	0.6	4429.63	1/2$^+$			
		5785.5	4.2	3914.6	5/2$^+$	D+Q[h]	+0.16[h] *11*	
		6022.2	5.2	3677.9	3/2$^-$	D+Q[h]	+0.35[h] *9*	
		6717.8	8.1	2982.0	3/2$^+$			
		7059.2	17	2640.5	1/2$^-$	D+Q[h]	−0.58[h] *7*	
		7308.8	1.5	2390.9	1/2$^+$			
		7623.3	3.1	2076.2	7/2$^+$			
		9258.7	62	440.2	5/2$^+$	D+Q[h]	−0.18[h] *6*	
		9698.7	100	0.0	3/2$^+$	D+Q[h]	+0.14[h] *4*	
9732.53	7/2	1256.8	7.0	8475.7	3/2$^+$,5/2$^+$			
		1430.9	4.5	8301.6	5/2$^-$,7/2$^-$			
		1671.5	3.0	8061	5/2$^+$,7/2,9/2$^+$			
		1856.3	6.0	7876.2	5/2			
		1896.8	3.0	7835.7	7/2,(5/2$^+$)			
		1981.8	5.0	7750.6	(5/2$^-$,3/2$^-$)	D(+Q)[h]	+0.02[h] *4*	
		2320.0	1.0	7412.4	5/2$^+$,7/2$^+$,9/2$^+$			
		2452.1	3.0	7280.3	5/2$^-$,7/2$^-$			
		2912.1	6.0	6820.2	5/2$^-$	D+Q[h]	−0.11[h] *4*	
		3154.3	14	6578.0	(9/2$^+$,5/2$^+$)	D(+Q)[h]	−0.01[h] *3*	
		3537.6	7.5	6194.6	5/2$^-$	D+Q[h]	−3.4[h] *7*	
		3690.3	70	6041.9	7/2$^-$	D+Q[h]	+0.05[h] *4*	
		3991.2	18	5741.0	5/2$^+$	D(+Q)[h]	0.00[h] *3*	
		4353.5	20	5378.56	5/2$^+$	D(+Q)[h]	+0.02[h] *3*	
		5817.5	21	3914.6	5/2$^+$	D+Q[h]	−0.12[h] *5*	
		5883.8	95	3847.9	5/2$^-$	D+Q[h]	−0.05[h] *2*	
		7027.6	85	2703.8	9/2$^+$	D(+Q)[h]	−0.02[h] *2*	
		7655.0	34	2076.2	7/2$^+$	D+Q[h]	+0.118[h] *5*	
		9290.3	100	440.2	5/2$^+$	D+Q[h]	+0.033[h] *7*	
9755.5	3/2$^+$	5325.2	1.0	4429.63	1/2$^+$			
		5840.1	7.1	3914.6	5/2$^+$			
		5906.8	14	3847.9	5/2$^-$			

$^{23}_{11}Na_{12}$-30

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ	α[i]	Comments
9755.5	3/2$^+$	6076.7	17	3677.9	3/2$^-$				
		7113.8	100	2640.5	1/2$^-$				
		7363.3	1.4	2390.9	1/2$^+$				
		9313.3	13	440.2	5/2$^+$				
		9753.3	16	0.0	3/2$^+$				
9802.9	(15/2$^+$)	2535[@] *1*	71[@] *5*	7268.1	13/2$^+$	(M1+E2)[@]		0.00052 *6*	α(K)=2.17×10^{-6} *10*; α(L)=1.30×10^{-7} *6*; α(M)=2.91×10^{-9} *13* α(IPF)=0.00052 *6*
		3568[@] *1*	100[@] *5*	6235.4	(13/2$^+$)	(M1+E2)[@]		0.00095 *8*	α(K)=1.29×10^{-6} *4*; α(L)=7.75×10^{-8} *20*; α(M)=1.74×10^{-9} *5* α(IPF)=0.00094 *8*
		4269[@] *1*	29[@] *5*	5534.2	11/2$^+$	E2[@]		1.27×10^{-3}	α(K)=1.021×10^{-6} *15*; α(L)=6.12×10^{-8} *9*; α(M)=1.370×10^{-9} *20* α(IPF)=0.001265 *18* B(E2)(W.u.)=3.5 *14*
9815.7	5/2$^+$	1514.0	0.3	8301.6	5/2$^-$,7/2$^-$				
		1851.6	4.7	7964					
		1924.4	0.9	7891.2	5/2$^+$				
		1943.0	1.6	7872.6	3/2,(5/2$^+$)				
		2403.2	2.2	7412.4	5/2$^+$,7/2$^+$,9/2$^+$				
		2682.0	2.8	7133.5	3/2$^+$,5/2$^+$				
		2744.7	9.4	7070.8					
		2868.1	11	6947.4	(3/2$^+$)				
		3080.0	2.2	6735.5	3/2$^+$				
		3197.2	1.6	6618.3	(7/2,5/2)$^+$				
		3889.6	1.6	5925.8	7/2$^+$				
		4049.3	24	5766.03	3/2$^+$	D+Q	−0.039 *13*		δ: From (p,γ).
		4074.3	5.0	5741.0	5/2$^+$				
		5039.9	4.4	4775.2	7/2$^+$				
		5385.4	7.5	4429.63	1/2$^+$				
		5900.3	15	3914.6	5/2$^+$				
		5967.0	0.6	3847.9	5/2$^-$				
		6832.6	100	2982.0	3/2$^+$				
		7110.7	21	2703.8	9/2$^+$				
		7423.5	1.9	2390.9	1/2$^+$				
		7738.1	50	2076.2	7/2$^+$				
		9373.5	23	440.2	5/2$^+$				
		9813.5	20	0.0	3/2$^+$				
9835.4	3/2$^+$	1944.1	3.8	7891.2	5/2$^+$				
		2701.7	5.0	7133.5	3/2$^+$,5/2$^+$				
		2764.4	0.8	7070.8					

$^{23}_{11}Na_{12}$-31

$\gamma(^{23}Na)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[b]	E_f	J^{π}_f	Mult.[g]
9835.4	3/2+	3099.7	3.5	6735.5	3/2+	
		3640.5	11	6194.6	5/2−	
		4094.0	4.0	5741.0	5/2+	
		4456.4	5.5	5378.56	5/2+	
		5405.1	12	4429.63	1/2+	
		5920.0	30	3914.6	5/2+	
		5986.7	8.5	3847.9	5/2−	
		6156.6	0.5	3677.9	3/2−	
		6852.3	0.5	2982.0	3/2+	
		7443.2	30	2390.9	1/2+	
		9393.1	35	440.2	5/2+	
		9833.1	100	0.0	3/2+	
9850.1	1/2+	5419.8	11	4429.63	1/2+	
		6171.3	33	3677.9	3/2−	
		6867.0	6.7	2982.0	3/2+	
		7208.4	97	2640.5	1/2−	
		7457.9	100	2390.9	1/2+	
		9407.8	0.9	440.2	5/2+	
		9847.8	55	0.0	3/2+	
9875.6		3833[@] *1*	100[@] *2*	6041.9	7/2−	
		7171[@] *1*	100[@] *2*	2703.8	9/2+	
9890.9	3/2	4124.5	8.7	5766.03	3/2+	
		4511.9	8.7	5378.56	5/2+	
		5975.5	42	3914.6	5/2+	
		6042.2	24	3847.9	5/2−	
		6212.1	33	3677.9	3/2−	
		7249.2	92	2640.5	1/2−	
		7498.7	34	2390.9	1/2+	
		9448.6	75	440.2	5/2+	
		9888.6	100	0.0	3/2+	
9917.5	(3/2+,5/2,7/2+)	3049.6	13	6867.7	5/2+,3/2+	
		5141.7	18	4775.2	7/2+	
		6002[@] *1*	100	3914.6	5/2+	
		6068.7	55	3847.9	5/2−	
		9475.2	55	440.2	5/2+	
		9915.2	10	0.0	3/2+	
9924.3	(3/2,7/2)	9482[@] *1*	100	440.2	5/2+	
9964.6	(9/2,13/2)	4430[@] *1*	100	5534.2	11/2+	D+Q[@]
9988.2	11/2−	3946[@] *1*	100	6041.9	7/2−	Q[@]
10003.2	1/2−	4036.9	5.5	5965.9	3/2−	

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [b]	E_f	J_f^π	Mult. [g]	δ	α [i]	Comments
10003.2	1/2⁻	4236.8	23	5766.03	3/2⁺				
		5572.8	6.4	4429.63	1/2⁺				
		6324.4	7.4	3677.9	3/2⁻				
		7020.0	4.0	2982.0	3/2⁺				
		7361.4	100	2640.5	1/2⁻				
		7611.0	26	2390.9	1/2⁺				
		10000.9	40	0.0	3/2⁺				
10017.4	5/2⁺	1386.4	0.3	8631.0					
		1599.9	0.9	8417.4	3/2⁺	M1+E2 [h]	+0.37 [h] *4*	1.03×10^{-4} *2*	α(K)=4.43×10^{-6} *7*; α(L)=2.66×10^{-7} *4*; α(M)=5.95×10^{-9} *9* α(IPF)=9.80×10^{-5} *16*
		2141.1	0.9	7876.2	5/2	D+Q [h]	−0.09 [h] *7*		
		2565.7	1.8	7451.5	5/2⁺,3/2⁺	M1+E2 [h]	−0.49 [h] *3*	5.03×10^{-4} *8*	α(K)=2.08×10^{-6} *3*; α(L)=1.244×10^{-7} *18*; α(M)=2.79×10^{-9} *4* α(IPF)=0.000501 *8*
		2740.1	0.9	7280.3	5/2⁻,7/2⁻				
		2883.7	0.6	7133.5	3/2⁺,5/2⁺				
		3096.6	0.9	6920.6	3/2⁻				
		3281.6	0.6	6735.5	3/2⁺				
		3398.8	11	6618.3	(7/2,5/2)⁺	M1(+E2) [h]	0.00 [h] *1*	8.11×10^{-4}	α(K)=1.357×10^{-6} *19*; α(L)=8.13×10^{-8} *12*; α(M)=1.82×10^{-9} *3* α(IPF)=0.000810 *12*
		3975.1	0.3	6041.9	7/2⁻				
		4250.9	0.9	5766.03	3/2⁺	M1+E2 [h]	−0.15 [h] *4*	1.10×10^{-3}	α(K)=9.96×10^{-7} *14*; α(L)=5.97×10^{-8} *9*; α(M)=1.337×10^{-9} *19* α(IPF)=0.001102 *16*
		4276.0	1.2	5741.0	5/2⁺				
		4638.3	2.1	5378.56	5/2⁺	M1+E2 [h]	−0.05 [h] *4*	1.22×10^{-3}	α(K)=8.86×10^{-7} *13*; α(L)=5.30×10^{-8} *8*; α(M)=1.189×10^{-9} *17* α(IPF)=0.001223 *18* δ: or +1.3 *2*.
		5241.6	0.9	4775.2	7/2⁺				
		6101.9	56	3914.6	5/2⁺	M1+E2 [h]	+0.05 [h] *2*		
		6168.6	15	3847.9	5/2⁻	E1(+M2) [h]	0.00 [h] *2*		
		6338.6	35	3677.9	3/2⁻	E1+M2 [h]	−0.020 [h] *6*		
		7034.2	100	2982.0	3/2⁺	M1+E2 [h]	−0.032 [h] *5*		
		7312.4	0.3	2703.8	9/2⁺				
		7625.1	1.2	2390.9	1/2⁺				
		7939.7	15	2076.2	7/2⁺	M1+E2 [h]	−0.276 [h] *14*		
		9575.1	44	440.2	5/2⁺	M1+E2 [h]	−0.207 [h] *13*		

$^{23}_{11}Na_{12}$-33

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	δ
10017.4	5/2$^+$	10015.1	4.7	0.0	3/2$^+$	M1+E2[h]	−0.126[h] *11*
10033.8		1087[@] *1*	20[@] *10*	8946.8	(7/2$^-$)		
		5258[@] *1*	100[@] *20*	4775.2	7/2$^+$		
10036.4		9594[@] *1*	100	440.2	5/2$^+$		
10049.1		6200.3	73	3847.9	5/2$^-$		
		7971.4	55	2076.2	7/2$^+$		
		9606.7	100	440.2	5/2$^+$		
10070.9	(5/2,7/2)	7993.2	100	2076.2	7/2$^+$		
		9628.5	64	440.2	5/2$^+$		
		10068.5	14	0.0	3/2$^+$		
10075.9	3/2,5/2	3255.5	13	6820.2	5/2$^-$		
		4033.6	23	6041.9	7/2$^-$		
		4109.6	6.4	5965.9	3/2$^-$		
		4334.5	10	5741.0	5/2$^+$		
		5300.0	82	4775.2	7/2$^+$		
		6227.1	73	3847.9	5/2$^-$		
		6397.0	18	3677.9	3/2$^-$		
		7092.7	68	2982.0	3/2$^+$		
		7434.1	4.1	2640.5	1/2$^-$		
		7998.2	100	2076.2	7/2$^+$		
		9633.5	30	440.2	5/2$^+$		
		10073.5	26	0.0	3/2$^+$		
10085.3	1/2$^+$	3137.7	15	6947.4	(3/2$^+$)		
		3164.5	26	6920.6	3/2$^-$		
		3349.5	18	6735.5	3/2$^+$		
		3779.4	100	6305.6	1/2$^+$		
		4318.8	85	5766.03	3/2$^+$		
		5654.9	12	4429.63	1/2$^+$		
		6406.4	24	3677.9	3/2$^-$		
		7102.1	5.8	2982.0	3/2$^+$		
		7693.0	18	2390.9	1/2$^+$		
		9642.9	27	440.2	5/2$^+$		
		10082.9	54	0.0	3/2$^+$		
10114.8	1/2$^+$	4148.5	5.6	5965.9	3/2$^-$		
		4348.3	9.7	5766.03	3/2$^+$		
		7131.6	100	2982.0	3/2$^+$		
		7722.5	2.1	2390.9	1/2$^+$		
		10112.4	12	0.0	3/2$^+$		
10125.9	5/2	4083.6	11	6041.9	7/2$^-$		
		4159.6	7.9	5965.9	3/2$^-$		
		4384.5	33	5741.0	5/2$^+$		

$^{23}_{11}Na_{12}$-34

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [b]	E_f	J_f^π	Mult. [g]	δ	α [i]	Comments
10125.9	5/2	4746.8	11	5378.56	5/2$^+$				
		6210.4	15	3914.6	5/2$^+$				
		6277.1	20	3847.9	5/2$^-$				
		6447.0	88	3677.9	3/2$^-$				
		7142.7	10	2982.0	3/2$^+$				
		8048.2	100	2076.2	7/2$^+$				
		9683.5	71	440.2	5/2$^+$				
		10123.5	50	0.0	3/2$^+$				
10156.4		9714 [@] *1*	100	440.2	5/2$^+$				
10169.6	5/2$^+$	1693.8	1.3	8475.7	3/2$^+$,5/2$^+$				
		2108.5	2.2	8061	5/2$^+$,7/2,9/2$^+$				
		2296.9	5.6	7872.6	3/2,(5/2$^+$)	D+Q [h]	+0.09 [h] *3*		
		2333.8	3.8	7835.7	7/2,(5/2$^+$)	D(+Q) [h]	0.00 [h] *3*		
		2889.1	1.8	7280.3	5/2$^-$,7/2$^-$				
		3301.6	15	6867.7	5/2$^+$,3/2$^+$				
		3433.8	1.1	6735.5	3/2$^+$				
		3974.6	2.0	6194.6	5/2$^-$	E1 [h]		1.67×10^{-3}	α(K)=8.6×10^{-7} *3*; α(L)=5.13×10^{-8} *17*; α(M)=1.15×10^{-9} *4* α(IPF)=0.00167 *5*
		4127.3	2.4	6041.9	7/2$^-$	E1 [h]		1.73×10^{-3}	α(K)=8.20×10^{-7} *14*; α(L)=4.91×10^{-8} *8*; α(M)=1.101×10^{-9} *18* α(IPF)=0.00173 *3*
		4243.4	4.2	5925.8	7/2$^+$	M1+E2 [h]	+0.18 [h] *4*	1.10×10^{-3}	α(K)=9.99×10^{-7} *14*; α(L)=5.98×10^{-8} *9*; α(M)=1.341×10^{-9} *19* α(IPF)=0.001101 *16* δ: or >−4.
		4428.1	5.8	5741.0	5/2$^+$	M1+E2 [h]	−0.41 [h] *8*	1.18×10^{-3} *2*	α(K)=9.46×10^{-7} *14*; α(L)=5.67×10^{-8} *8*; α(M)=1.270×10^{-9} *18* α(IPF)=0.001184 *19* δ: or +2.7 *7*.
		4790.5	15	5378.56	5/2$^+$				
		5393.7	24	4775.2	7/2$^+$	M1+E2 [h]	+0.30 [h] *2*	1.44×10^{-3}	α(K)=7.28×10^{-7} *11*; α(L)=4.36×10^{-8} *7*; α(M)=9.77×10^{-10} *14* α(IPF)=0.001443 *21*
		6254.1	1.3	3914.6	5/2$^+$				
		6320.8	1.8	3847.9	5/2$^-$				
		7186.4	100	2982.0	3/2$^+$	M1+E2 [h]	+0.14 [h] *2*		
		7464.5	4.4	2703.8	9/2$^+$	E2(+M3) [h]	+0.03 [h] *5*		
		8091.9	3.3	2076.2	7/2$^+$	M1+E2 [h]	+0.11 [h] *3*		

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [b]	E_f	J_f^π	Mult. [g]	δ	α [i]	Comments
10169.6	5/2$^+$	9727.2	18	440.2	5/2$^+$	M1+E2 [h]	+1.33 [h] *9*		
		10167.2	8.9	0.0	3/2$^+$	M1+E2 [h]	−3.4 [h] *19*		
10212.9		1266 [@] *1*	100	8946.8	(7/2$^-$)				
10231.7	5/2$^+$	1755.9	0.7	8475.7	3/2$^+$,5/2$^+$				
		1814.2	2.9	8417.4	3/2$^+$				
		1930.0	0.7	8301.6	5/2$^-$,7/2$^-$				
		2667.6	1.3	7563.9	(5/2)$^+$				
		2819.1	1.1	7412.4	5/2$^+$,7/2$^+$,9/2$^+$				
		3098.0	4.7	7133.5	3/2$^+$,5/2$^+$				
		3284.0	2.0	6947.4	(3/2$^+$)				
		3363.7	2.7	6867.7	5/2$^+$,3/2$^+$	M1+E2 [h]	+0.12 [h] *10*	8.00×10^{-4}	α(K)=1.378×10^{-6} *20*; α(L)=8.25×10^{-8} *12*; α(M)=1.85×10^{-9} *3* α(IPF)=0.000798 *12*
		3613.1	8.2	6618.3	(7/2,5/2)$^+$	M1+E2 [h]	−0.03 [h] *2*	8.89×10^{-4}	α(K)=1.245×10^{-6} *18*; α(L)=7.46×10^{-8} *11*; α(M)=1.671×10^{-9} *24* α(IPF)=0.000888 *13*
		4189.4	8.2	6041.9	7/2$^-$	E1 [h]		1.76×10^{-3}	α(K)=8.04×10^{-7} *12*; α(L)=4.82×10^{-8} *7*; α(M)=1.079×10^{-9} *16* α(IPF)=0.001755 *25*
		4305.5	40	5925.8	7/2$^+$	M1+E2 [h]	+0.04 [h] *2*	1.12×10^{-3}	α(K)=9.79×10^{-7} *14*; α(L)=5.86×10^{-8} *9*; α(M)=1.313×10^{-9} *19* α(IPF)=0.001119 *16*
		4465.2	1.3	5766.03	3/2$^+$				
		4490.2	0.7	5741.0	5/2$^+$				
		6316.2	24	3914.6	5/2$^+$				
		6382.9	0.7	3847.9	5/2$^-$				
		6552.8	10	3677.9	3/2$^-$	E1 [h]			
		7839.4	8.0	2390.9	1/2$^+$	E2 [h]			
		9789.3	100	440.2	5/2$^+$	M1+E2 [h]	+0.30 [h] *3*		
		10229.3	4.7	0.0	3/2$^+$	M1+E2 [h]	+0.03 [h] *2*		
10237.8		8160 [@] *1*	100	2076.2	7/2$^+$				
10243.7	1/2$^+$	2519.1	14	7724.4					
		4477.2	12	5766.03	3/2$^+$				
		5813.3	4	4429.63	1/2$^+$				
		6564.8	100	3677.9	3/2$^-$				
		7260.5	10	2982.0	3/2$^+$				
		7601.9	12	2640.5	1/2$^-$				
		7851.4	38	2390.9	1/2$^+$				
		9801.3	10	440.2	5/2$^+$				

$^{23}_{11}Na_{12}$-36

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ †	I_γ b	E_f	J_f^π	Mult. g	δ	Comments
10281.5	3/2+	3147.8 *12*	3.1	7133.5	3/2+,5/2+			
		4315.2 *9*	6.2	5965.9	3/2−			
		4515.0 *6*	16	5766.03	3/2+			
		4902.4 *6*	3.1	5378.56	5/2+			
		5505.6 *6*	3.3	4775.2	7/2+			
		6366.0 *6*	100	3914.6	5/2+			
		7298.3 *6*	11	2982.0	3/2+			
		7639.6 *6*	14	2640.5	1/2−			
		7889.2 *6*	36	2390.9	1/2+			
		9839.0 *6*	38	440.2	5/2+			
		10279.0 *6*	25	0.0	3/2+			
10318.0	3/2−	5887.6	41	4429.63	1/2+	D h		
		6469.1	13	3847.9	5/2−			
		6639.1	8.2	3677.9	3/2−			
		7334.7	25	2982.0	3/2+	D+Q h	+1.3 h *7*	
		7676.1	59	2640.5	1/2−	D+Q h	−0.58 h *27*	
		7925.6	3.5	2390.9	1/2+			
		9875.5	100	440.2	5/2+	D+Q h	+0.12 h *6*	
		10315.5	44	0.0	3/2+			
10333.8		8256 @ *1*	100	2076.2	7/2+			
10338.7	(1/2−)	3417.8	9.1	6920.6	3/2−			
		3518.2	2.7	6820.2	5/2−			
		4032.7	11	6305.6	1/2+			
		4372.4	4.2	5965.9	3/2−			
		6659.8	15	3677.9	3/2−			
		7355.4	88	2982.0	3/2+			
		7696.8	18	2640.5	1/2−			
		7946.3	45	2390.9	1/2+			
		9896.2 k	10	440.2	5/2+			E_γ: Placement from (p,γ) should be considered with caution. If J^π=1/2−, would be an [M2] transition to 5/2+.
		10336.2	100	0.0	3/2+			
10346.1	5/2+	4303.8	4.1	6041.9	7/2−			
		4579.6	12	5766.03	3/2+			
		4604.6	8.3	5741.0	5/2+			
		4967.0	5.5	5378.56	5/2+			
		5570.2	6.6	4775.2	7/2+			
		6430.5	27	3914.6	5/2+	D+Q h	−0.10 h *7*	
		6497.2	2.4	3847.9	5/2−			
		6667.2	5.2	3677.9	3/2−			

$^{23}_{11}Na_{12}$-37

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ †	I_γ [b]	E_f	J_f^π	Mult. [g]	δ
10346.1	5/2$^+$	7362.8	13	2982.0	3/2$^+$	D(+Q) [h]	−0.09 [h] *10*
		7953.7	12	2390.9	1/2$^+$		
		8268.3	52	2076.2	7/2$^+$	D+Q [h]	−0.06 [h] *2*
		9903.6	97	440.2	5/2$^+$	D+Q [h]	+0.21 [h] *8*
		10343.6	100	0.0	3/2$^+$	D+Q [h]	−0.27 [h] *5*
10353.8	3/2$^+$	2462.5	5.0	7891.2	5/2$^+$		
		3618.0	1.5	6735.5	3/2$^+$		
		4587.3	9.4	5766.03	3/2$^+$		
		4612.3	5.9	5741.0	5/2$^+$		
		4974.7	10	5378.56	5/2$^+$		
		5923.4	4.1	4429.63	1/2$^+$		
		6438.2	2.6	3914.6	5/2$^+$		
		6504.9	88	3847.9	5/2$^-$		
		6674.9	24	3677.9	3/2$^-$		
		7370.5	12	2982.0	3/2$^+$		
		7711.9	100	2640.5	1/2$^-$		
		7961.4	8.2	2390.9	1/2$^+$		
		8276.0	7.6	2076.2	7/2$^+$		
		9911.3	11	440.2	5/2$^+$		
		10351.3	4.4	0.0	3/2$^+$		
10354.0	13/2$^-$	2362 [@] *1*	7.8 [@] *20*	7991.5	(11/2)		
		2960 [@] *1*	2.2 [@] *6*	7393.4	(11/2$^+$)		
		3999 [@] *1*	100 [@] *4*	6354.2	9/2$^-$	Q [@]	
		4820 [@] *1*	12 [@] *2*	5534.2	11/2$^+$	D [@]	
10404.8	(11/2$^-$)	4169 [@] *1*	100	6235.4	(13/2$^+$)	(D) [@]	
10408.8		8331 [@] *1*	100	2076.2	7/2$^+$		
10438.5	5/2$^+$	2021.0	9.2	8417.4	3/2$^+$		
		3025.9	5.8	7412.4	5/2$^+$,7/2$^+$,9/2$^+$		
		3819.9	9.4	6618.3	(7/2,5/2)$^+$		
		5059.3	3.3	5378.56	5/2$^+$		
		6522.9	25	3914.6	5/2$^+$	D+Q [h]	+0.50 [h] *10*
		6759.5	1.4	3677.9	3/2$^-$		
		7455.2	100	2982.0	3/2$^+$		
		8360.7	26	2076.2	7/2$^+$	D+Q [h]	+0.09 [h] *3*
		9996 [@] *1*	56	440.2	5/2$^+$	D+Q [h]	−0.22 [h] *10*
		10436.0	42	0.0	3/2$^+$	D+Q [h]	+0.24 [h] *8*
10448.7		1972.9	17	8475.7	3/2$^+$,5/2$^+$		
		2557.3	7.9	7891.2	5/2$^+$		

$^{23}_{11}Na_{12}$-38

Adopted Levels, Gammas (continued)

$\gamma(^{23}Na)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ [b]	E_f	J_f^π	Mult. [g]	α [i]	Comments
10448.7		4406.4	16	6041.9	$7/2^-$			
		6533.1	48	3914.6	$5/2^+$			
		6599.8	100	3847.9	$5/2^-$			
		7743.5	48	2703.8	$9/2^+$			
		8370.9	55	2076.2	$7/2^+$			
		10006.2	7.9	440.2	$5/2^+$			
		10446.2	2.4	0.0	$3/2^+$			
10478.8	$3/2^+$	2754.2	7.4	7724.4				
		3658.2	4.2	6820.2	$5/2^-$			
		4712.3	10	5766.03	$3/2^+$			
		4737.3	45	5741.0	$5/2^+$			
		5099.6	100	5378.56	$5/2^+$			
		6563.2	35	3914.6	$5/2^+$			
		6629.9	7.7	3847.9	$5/2^-$			
		7836.9	4.5	2640.5	$1/2^-$			
		8086.4	10	2390.9	$1/2^+$			
		10036.3	11	440.2	$5/2^+$			
		10476.2	87	0.0	$3/2^+$			
10501.9	$3/2^-$	4760.4	1.3	5741.0	$5/2^+$			
		6071.4	1.9	4429.63	$1/2^+$			
		6653.0	13	3847.9	$5/2^-$			
		6822.9	9.1	3677.9	$3/2^-$			
		7518.6	3.8	2982.0	$3/2^+$			
		7860.0	3.2	2640.5	$1/2^-$			
		8109.5	9.1	2390.9	$1/2^+$			
		10059.4	47	440.2	$5/2^+$			
		10499.3	100	0.0	$3/2^+$			
10507.8	$1/2^+$	3425.6	20	7081.9	$3/2^-$			
		3586.9	14	6920.6	$3/2^-$			
		4201.8	6.2	6305.6	$1/2^+$			
		4541.4	9.7	5965.9	$3/2^-$			
		4741.2	11	5766.03	$3/2^+$			
		6077.3	31	4429.63	$1/2^+$			
		6828.8	30	3677.9	$3/2^-$			
		7524.5	38	2982.0	$3/2^+$			
		7865.9	100	2640.5	$1/2^-$			
		8115.4	34	2390.9	$1/2^+$			
		10065.2	11	440.2	$5/2^+$			
		10505.2	38	0.0	$3/2^+$			
10519.1	$5/2^+$	1888.0	1.75	8631.0				
		2101.6	4.25	8417.4	$3/2^+$	M1 [h]	2.88×10^{-4}	α(K)=2.78×10^{-6} *4*; α(L)=1.666×10^{-7} *24*; α(M)=3.73×10^{-9} *6* α(IPF)=0.000285 *4*

$^{23}_{11}Na_{12}$-39

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[g]	δ	α[i]	Comments
10519.1	2159.0	0.5	8360.0					
	2627.7	9.5	7891.2	$5/2^+$	M1[h]		5.07×10^{-4}	α(K)=1.97×10^{-6} *3*; α(L)=1.182×10^{-7} *17*; α(M)=2.65×10^{-9} *4* α(IPF)=0.000505 *7*
	2683.2	1.75	7835.7	$7/2,(5/2^+)$	D[h]			
	2955.0	0.75	7563.9	$(5/2)^+$				
	3067.4	2	7451.5	$5/2^+,3/2^+$	M1+E2[h]	−0.52[h] *7*	7.13×10^{-4} *12*	α(K)=1.591×10^{-6} *23*; α(L)=9.53×10^{-8} *14*; α(M)=2.13×10^{-9} *3* α(IPF)=0.000711 *12*
	3106.5	0.75	7412.4	$5/2^+,7/2^+,9/2^+$				
	3385.3	5.75	7133.5	$3/2^+,5/2^+$				
	3571.4	1.75	6947.4	$(3/2^+)$	M1+E2[h]	−0.06[h] *3*	8.75×10^{-4}	α(K)=1.266×10^{-6} *18*; α(L)=7.58×10^{-8} *11*; α(M)=1.698×10^{-9} *24* α(IPF)=0.000873 *13*
	3598.2	1.75	6920.6	$3/2^-$				
	3651.1	4.75	6867.7	$5/2^+,3/2^+$	M1[h]		9.03×10^{-4}	α(K)=1.227×10^{-6} *18*; α(L)=7.35×10^{-8} *11*; α(M)=1.647×10^{-9} *23* α(IPF)=0.000901 *13*
	3698.6	1.25	6820.2	$5/2^-$	(E1)[h]		1.56×10^{-3}	α(K)=9.33×10^{-7} *13*; α(L)=5.59×10^{-8} *8*; α(M)=1.252×10^{-9} *18* α(IPF)=0.001560 *22*
	3783.3	1.25	6735.5	$3/2^+$				
	3900.4	4.5	6618.3	$(7/2,5/2)^+$	M1+E2[h]	+0.06[h] *4*	9.90×10^{-4}	α(K)=1.120×10^{-6} *16*; α(L)=6.71×10^{-8} *10*; α(M)=1.503×10^{-9} *21* α(IPF)=0.000989 *14*
	4213.1	0.5	6305.6	$1/2^+$				
	4552.7	1	5965.9	$3/2^-$				
	4752.5	6.5	5766.03	$3/2^+$	M1+E2[h]	+0.17[h] *2*	1.26×10^{-3}	α(K)=8.58×10^{-7} *12*; α(L)=5.14×10^{-8} *8*; α(M)=1.152×10^{-9} *17* α(IPF)=0.001263 *18*
	4777.6	3.8	5741.0	$5/2^+$	(M1)[h]		1.27×10^{-3}	α(K)=8.52×10^{-7} *12*; α(L)=5.10×10^{-8} *8*; α(M)=1.143×10^{-9} *16* α(IPF)=0.001266 *18*
	5139.9	1.5	5378.56	$5/2^+$				
	6088.6	1	4429.63	$1/2^+$				
	6840.1	5.25	3677.9	$3/2^-$	(E1)[h]			
	7535.8	8.75	2982.0	$3/2^+$	(M1)[h]			
	7813.9	2	2703.8	$9/2^+$				
	8126.7	6	2390.9	$1/2^+$	(E2)[h]			
	8441.2	10.5	2076.2	$7/2^+$	M1+E2[h]	+0.43[h] *2*		δ: or +3.0 *2*.
	10076.5	62.5	440.2	$5/2^+$	M1+E2[h]	−0.19[h] *3*		
	10516.5	100	0.0	$3/2^+$	M1+E2[h]	−0.13[h] *2*		
10534.1	3613.2	15	6920.6	$3/2^-$				
	5758.1	11	4775.2	$7/2^+$				
	6855.1	15	3677.9	$3/2^-$				
	7550.8	3.3	2982.0	$3/2^+$				

$^{23}_{11}Na_{12}$-40

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ †	I_γ [b]	E_f	J_f^π	Mult. [g]	δ
10534.1		8141.7	9.5	2390.9	1/2$^+$		
		8456.2	7.1	2076.2	7/2$^+$		
		10091.5	20	440.2	5/2$^+$		
		10531.5	100	0.0	3/2$^+$		
10549.2	5/2$^+$	2657.8	6.0	7891.2	5/2$^+$		
		2824.6	6.5	7724.4			
		4582.8	14	5965.9	3/2$^-$		
		4807.7	7.0	5741.0	5/2$^+$		
		5170.0	16	5378.56	5/2$^+$		
		6118.7	70	4429.63	1/2$^+$		
		6633.6	75	3914.6	5/2$^+$		
		6870.2	4.0	3677.9	3/2$^-$		
		7565.9	95	2982.0	3/2$^+$		
		8156.8	46	2390.9	1/2$^+$		
		8471.3	17	2076.2	7/2$^+$	D+Q [h]	−0.07 [h] *6*
		10106.6	42	440.2	5/2$^+$	D+Q [h]	−0.19 [h] *8*
		10546.6	100	0.0	3/2$^+$	D+Q [h]	+0.19 [h] *6*
10574.6	3/2$^-$	3754.1	9.5	6820.2	5/2$^-$		
		5195.4	4.0	5378.56	5/2$^+$		
		6144.1	7.0	4429.63	1/2$^+$		
		6659.0	7.0	3914.6	5/2$^+$		
		6725.6	61	3847.9	5/2$^-$		
		6895.6	9.5	3677.9	3/2$^-$		
		7591.2	5.7	2982.0	3/2$^+$		
		7932.6	4.3	2640.5	1/2$^-$		
		8182.1	19	2390.9	1/2$^+$		
		10132.0	100	440.2	5/2$^+$		
10590.7	(13/2$^-$)	2599 [@] *1*	33 [@] *8*	7991.5	(11/2)		
		3322 [@] *1*	17 [@] *8*	7268.1	13/2$^+$		
		4236 [@] *1*	42 [@] *8*	6354.2	9/2$^-$		
		4355 [@] *1*	42 [@] *8*	6235.4	(13/2$^+$)	D+Q [@]	
		5056 [@] *1*	100 [@] *17*	5534.2	11/2$^+$	D [@]	
10616.9	5/2$^+$,3/2$^+$	3748.9	8.9	6867.7	5/2$^+$,3/2$^+$		
		4850.3	11	5766.03	3/2$^+$		
		6701.3	16	3914.6	5/2$^+$	D [h]	
		6937.9	30	3677.9	3/2$^-$	D+Q [h]	−0.6 [h] *5*
		8224.4	5.6	2390.9	1/2$^+$		
		8539.0	8.1	2076.2	7/2$^+$		
		10174.3	100	440.2	5/2$^+$	D [h]	

$^{23}_{11}Na_{12}$-41

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[g]	α[i]	Comments
10616.9	5/2$^+$,3/2$^+$	10614.3	6.1	0.0	3/2$^+$			
10698.0	(7/2,11/2)	4343[@] *1*	21[@] *5*	6354.2	9/2$^-$	D+Q[@]		
		7993[@] *1*	100[@] *11*	2703.8	9/2$^+$	(D)[@]		
10759.8		4524[@] *1*	100	6235.4	(13/2$^+$)			
10798.0		8720[@] *1*	100	2076.2	7/2$^+$			
10860.9		8782[@] *1*	100[@] *38*	2076.2	7/2$^+$			
		10419[@] *1*	23[@] *8*	440.2	5/2$^+$			
10923.0		8845[@] *1*	100	2076.2	7/2$^+$			
11073.7	(17/2$^+$)	2034[@] *1*	100[@] *25*	9039.5	(15/2)	D+Q[@]		
		4838[@] *1*	50[@] *13*	6235.4	(13/2$^+$)	(E2)[@]	1.44×10^{-3}	α(K)=8.59×10^{-7} *12*; α(L)=5.14×10^{-8} *8*; α(M)=1.153×10^{-9} *17* α(IPF)=0.001442 *21* B(E2)(W.u.)=0.53 *20*
11271.9	(11/2$^-$)	2325[@] *1*	33[@] *17*	8946.8	(7/2$^-$)			
		5036[@] *1*	100[@] *17*	6235.4	(13/2$^+$)	(E1)[@]	0.00203	α(K)=6.49×10^{-7} *9*; α(L)=3.89×10^{-8} *6*; α(M)=8.71×10^{-10} *13* α(IPF)=0.00203 *3* B(E1)(W.u.)=0.00039 *12*
11424.7	(11/2)	1070[@] *1*	100[@] *17*	10354.0	13/2$^-$	D[@]		
		9347[@] *1*	7[@] *3*	2076.2	7/2$^+$			
11538.8	(15/2$^+$)	4270[@] *1*	100[@] *50*	7268.1	13/2$^+$			
		6004[@] *1*	100[@] *50*	5534.2	11/2$^+$			
11651.6	(13/2$^+$)	2441[@] *1*	100[@] *29*	9210.4	(11/2$^+$)			
		4466[@] *1*	29[@] *14*	7185.3	(9/2$^+$)			
12013.5		9935[@] *1*	100	2076.2	7/2$^+$			
12122		9138	50[f] *9*	2982.0	3/2$^+$			
		9480	38[f] *12*	2640.5	1/2$^-$			
		9729	100[f] *26*	2390.9	1/2$^+$			
		11679	21[f] *9*	440.2	5/2$^+$			
		12119	85[f] *21*	0.0	3/2$^+$			
12184	(3/2)$^+$	8268	13[f] *4*	3914.6	5/2$^+$			
		8334	7[f] *2*	3847.9	5/2$^-$			
		8504	19[f] *4*	3677.9	3/2$^-$			
		9200	11[f] *2*	2982.0	3/2$^+$			
		10106	20[f] *4*	2076.2	7/2$^+$			
		11741	15[f] *4*	440.2	5/2$^+$			

$^{23}_{11}Na_{12}$-42

Adopted Levels, Gammas (continued)

γ(^{23}Na) (continued)

E_i(level)	J_i^π	E_γ †	I_γ [b]	E_f	J_f^π	Comments
12184	$(3/2)^+$	12181	100[f] 7	0.0	$3/2^+$	
12593.1		2792@	50@	9802.9	$(15/2^+)$	
		5323.6@ 19	100@	7268.1	$13/2^+$	
		6355@	50@	6235.4	$(13/2^+)$	
25400		23311		2076.2	$7/2^+$	
		24945		440.2	$5/2^+$	E_γ: Unresolved.
		25385		0.0	$3/2^+$	E_γ: Unresolved.

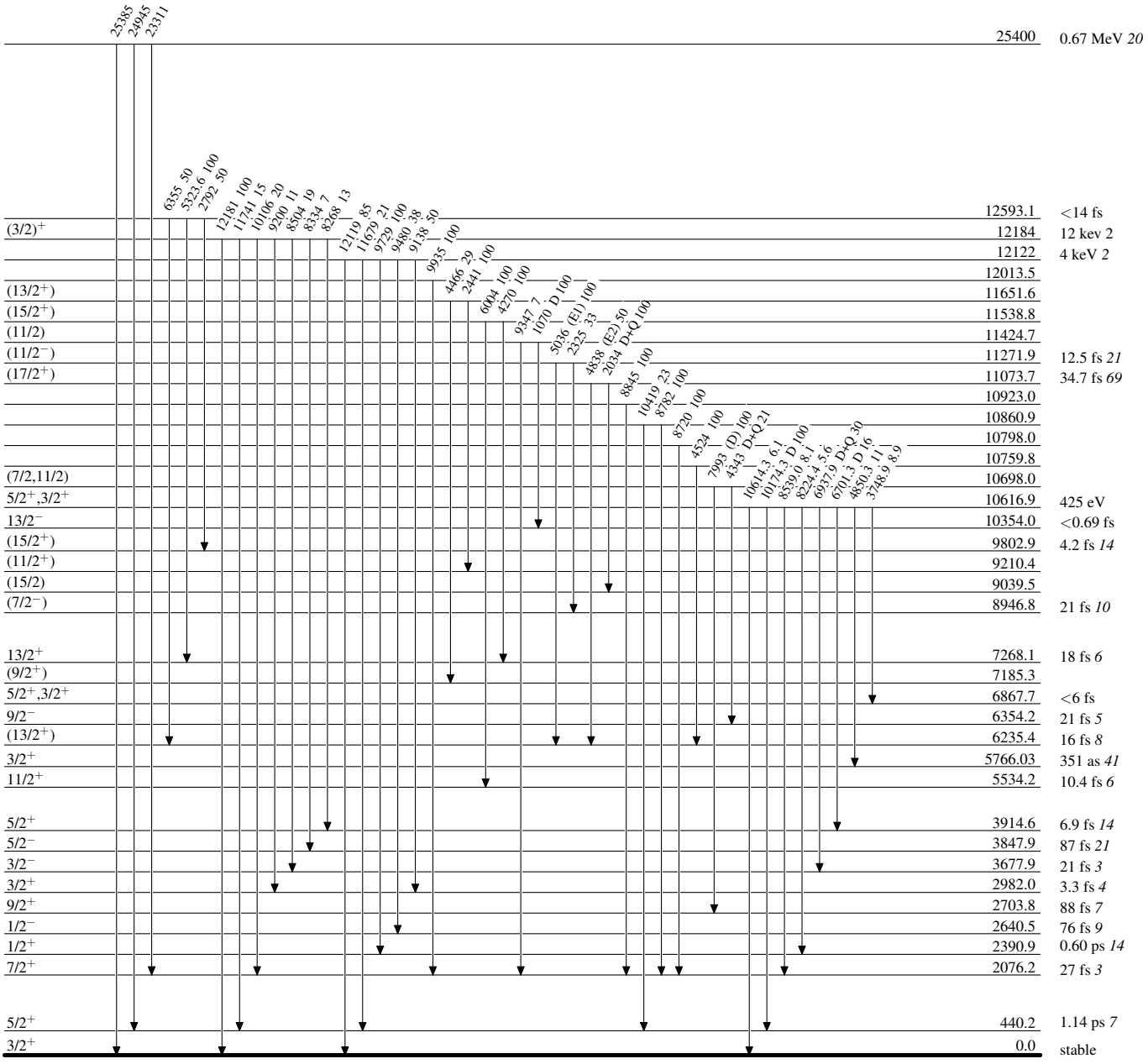
† From level energy difference (recoil energy subtracted), except where otherwise noted.
‡ Weighted average of data in (^{12}C,pγ), (d,nγ), and (p,p′γ).
# Weighted average of data in (^{12}C,pγ) and (p,p′γ).
@ From (^{12}C,pγ).
& From (d,nγ).
a From (γ,γ′).
b From (p,γ), except otherwise noted.
c In good agreement with weighted average of all available data.
d Weighted average of data from (p,γ), (γ,γ′), (p,αγ), and (t,α),(t,αγ).
e Weighted average of data from (p,γ) and (γ,γ′).
f From ^{19}F(α,γ).
g From (p,p′γ) and RUL, except otherwise noted.
h From (p,γ).
i Additional information 1.
j Multiply placed with intensity suitably divided.
k Placement of transition in the level scheme is uncertain.

$^{23}_{11}Na_{12}$-43

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

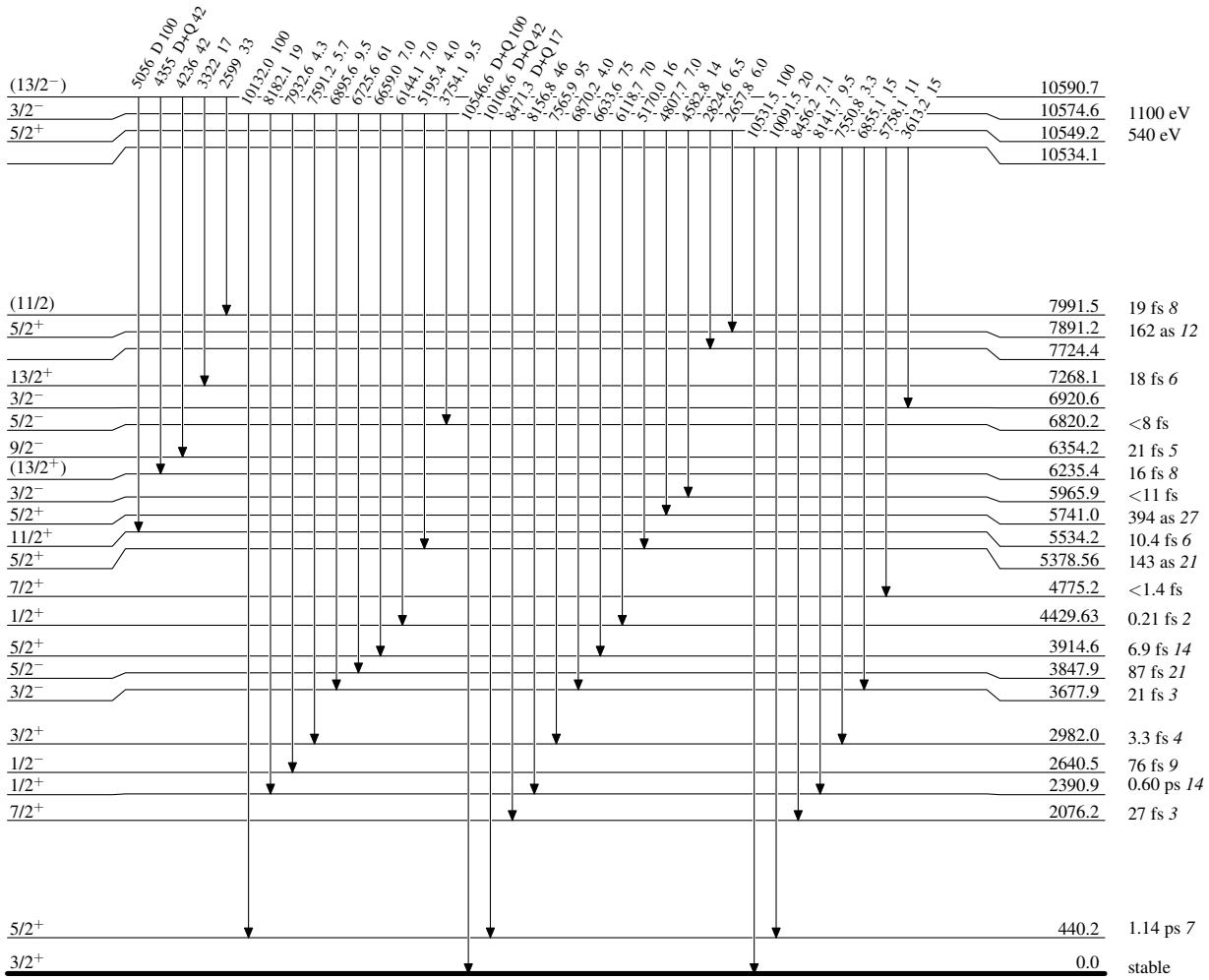


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

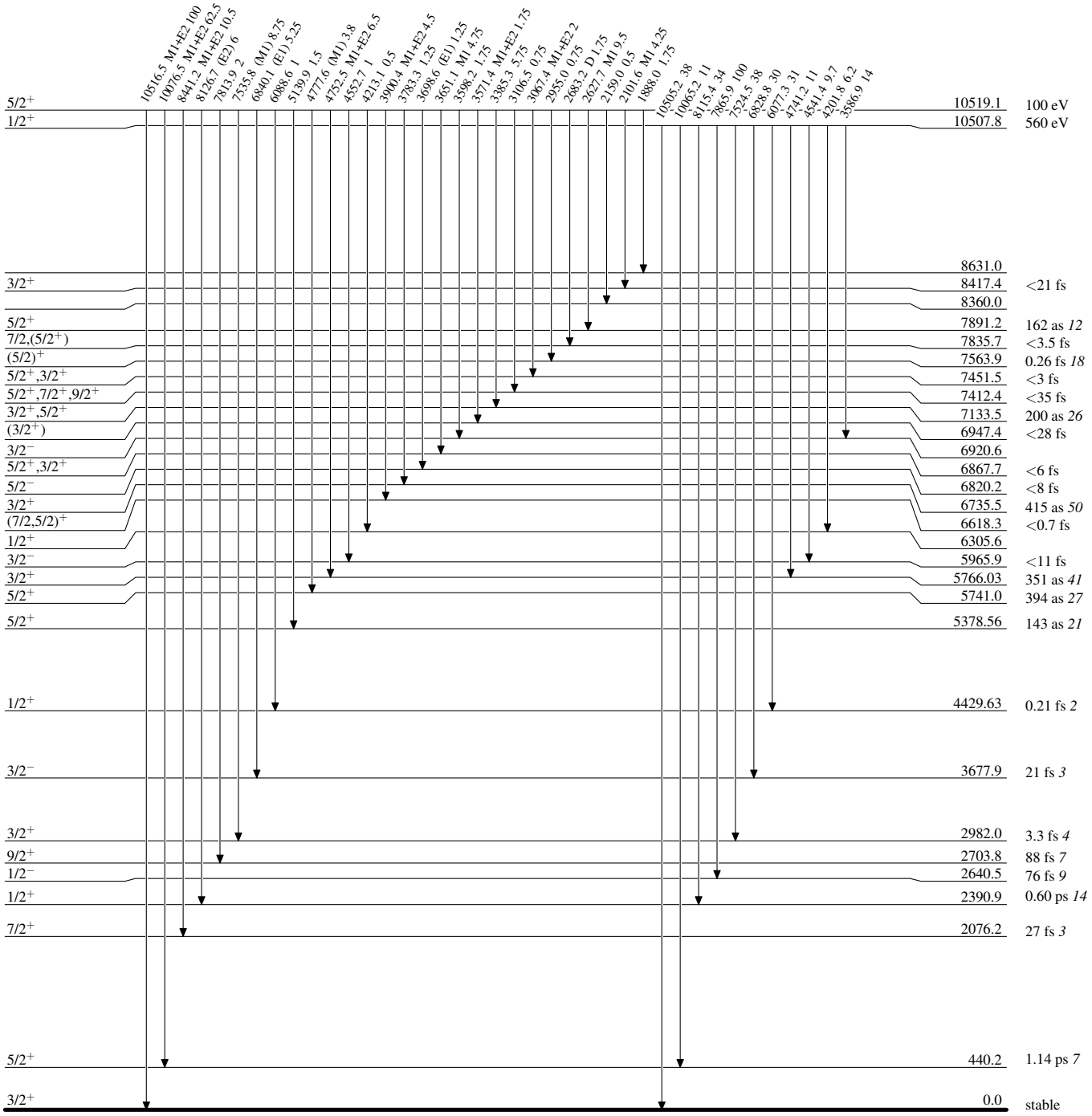


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

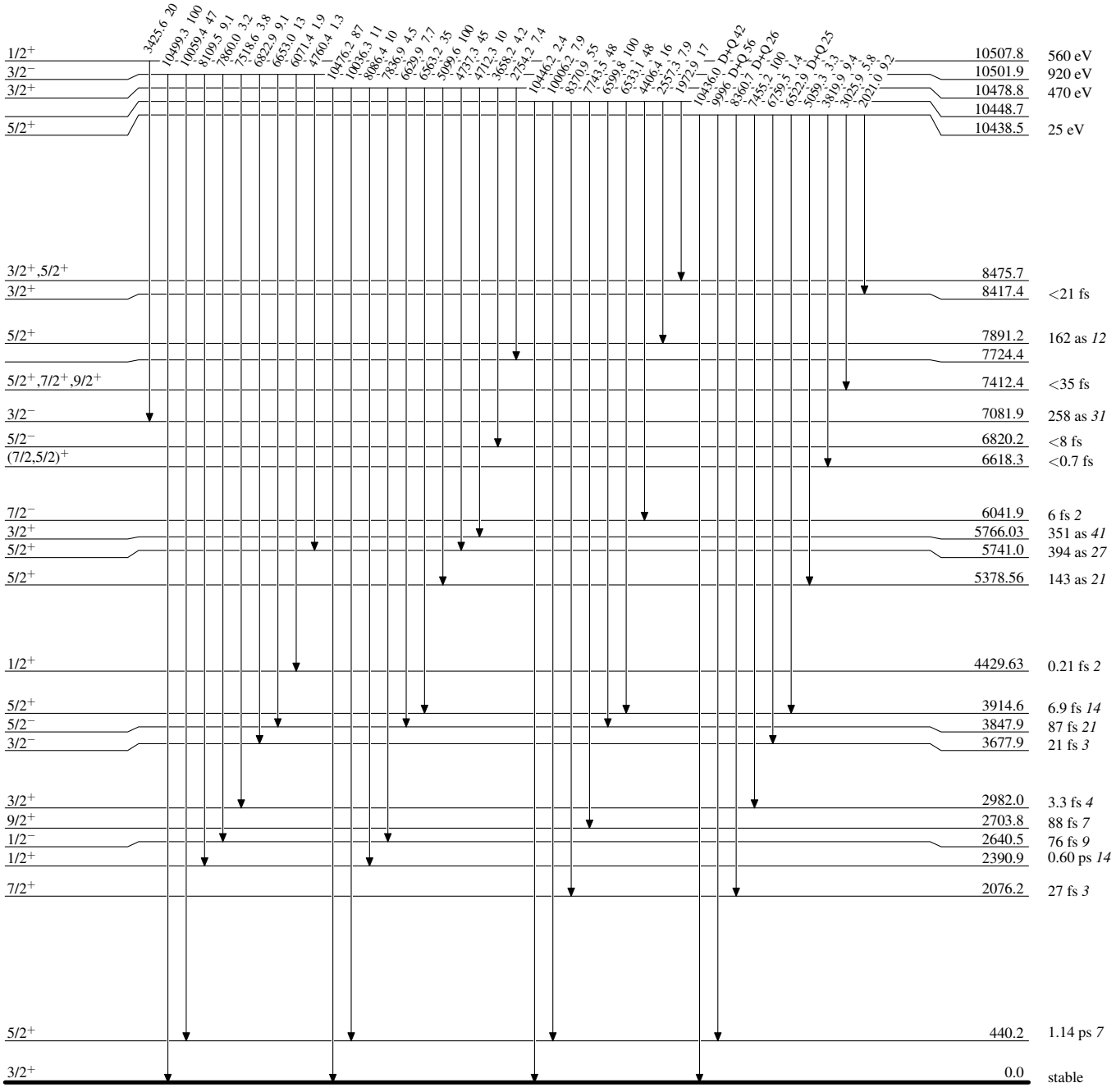


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{23}_{11}Na_{12}$

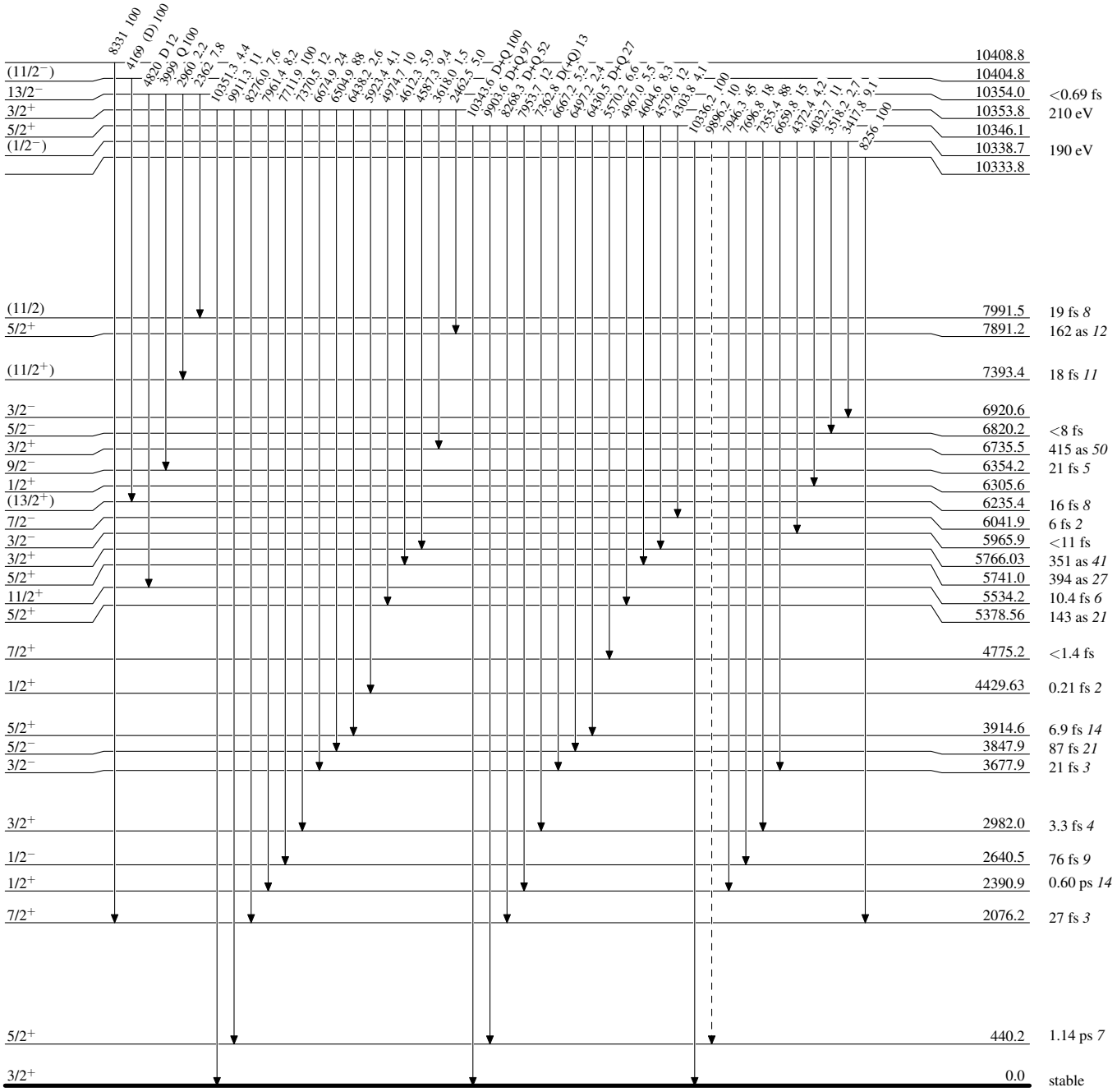
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

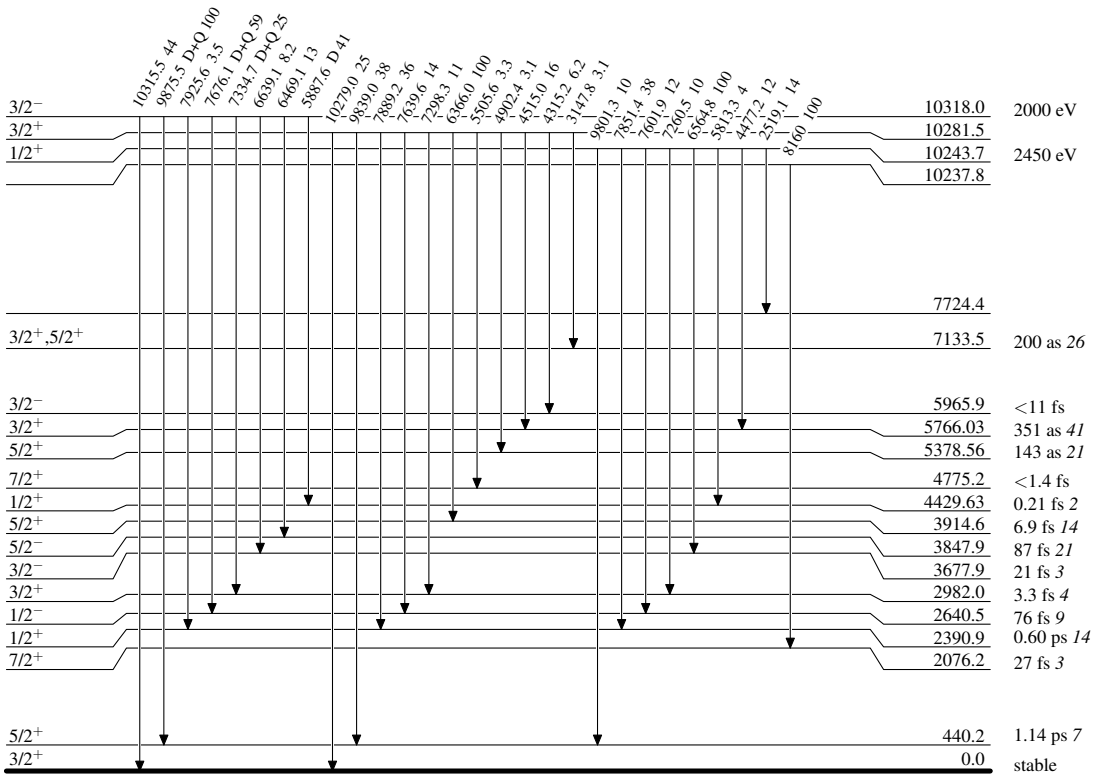


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

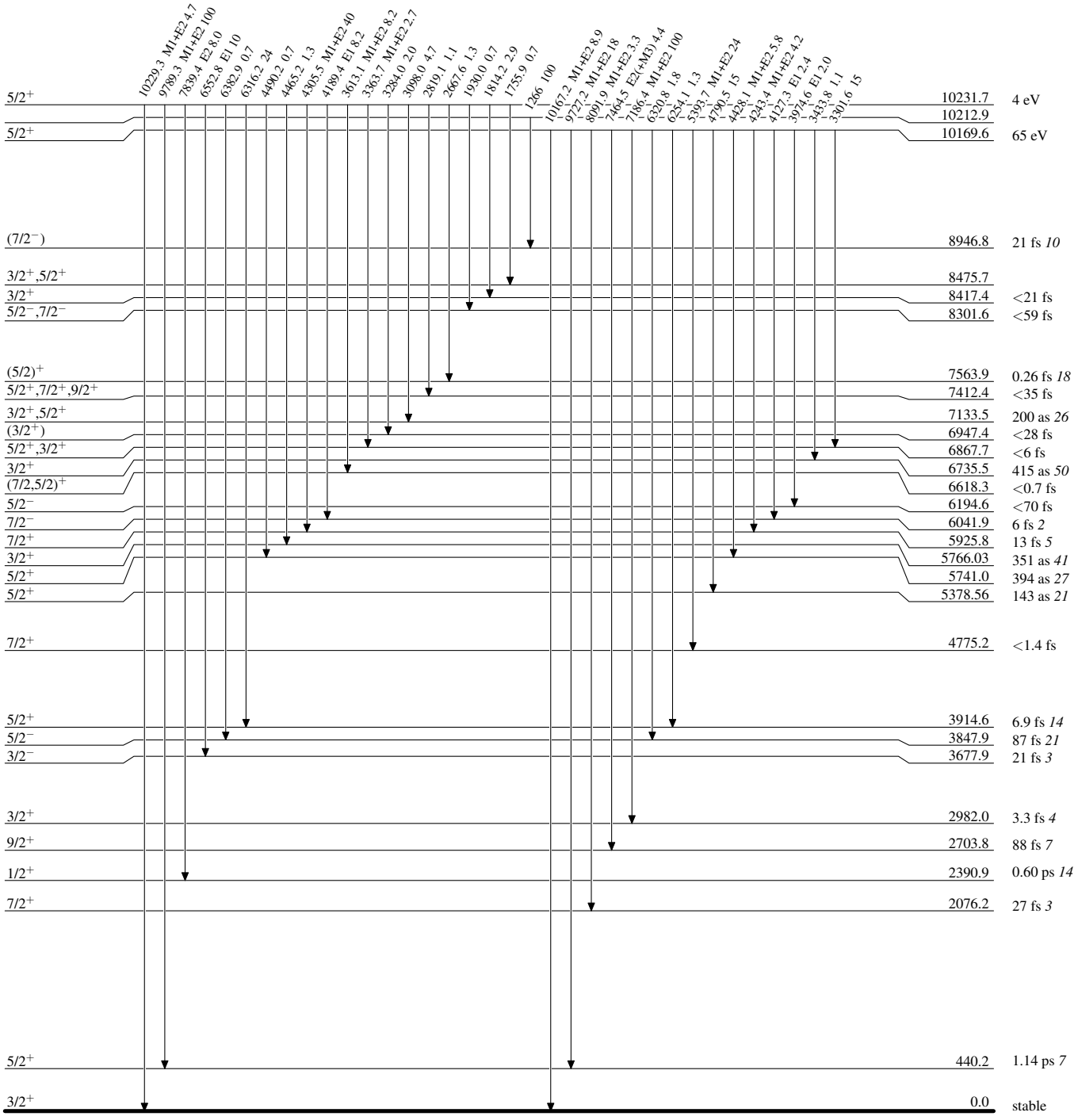


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

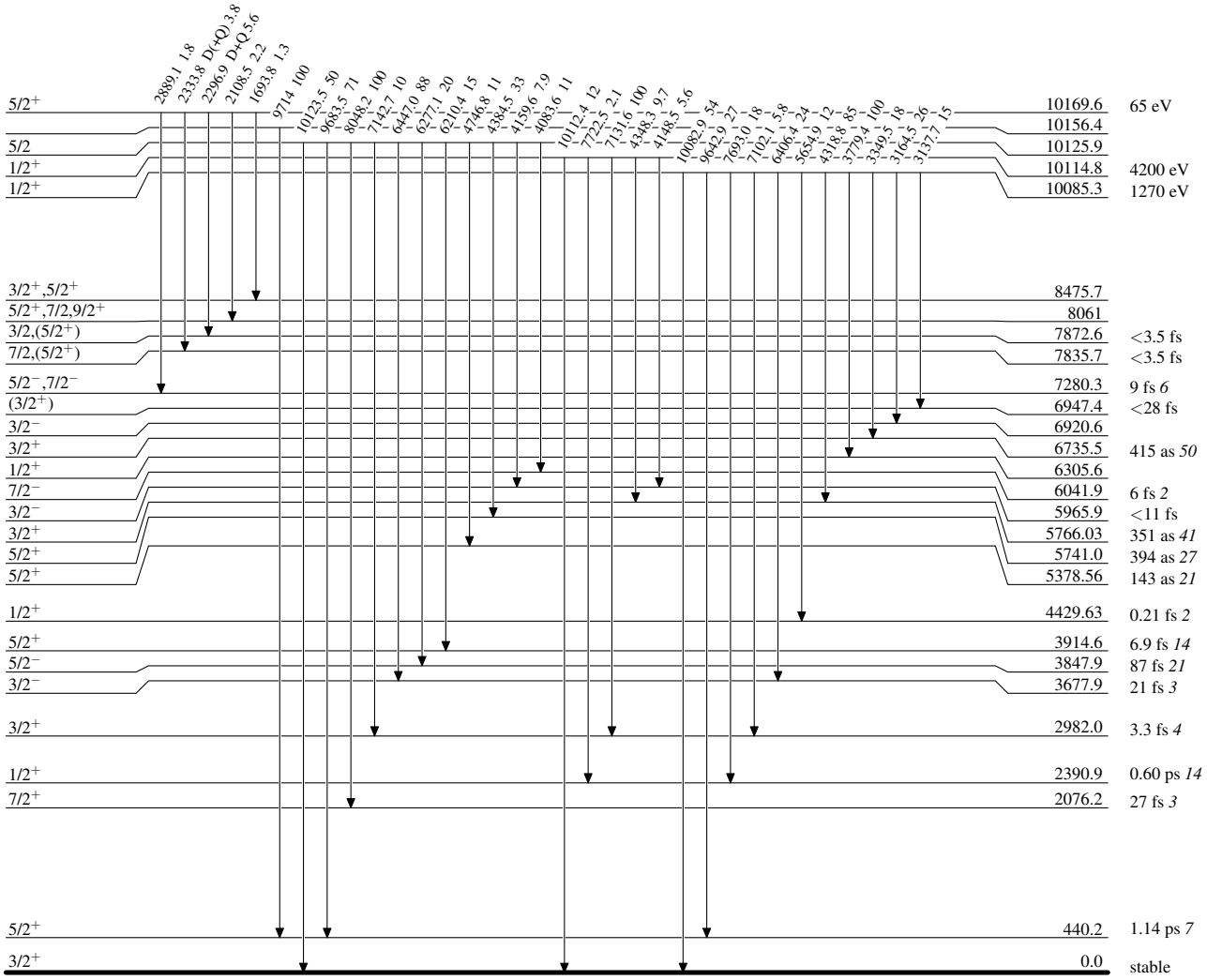


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

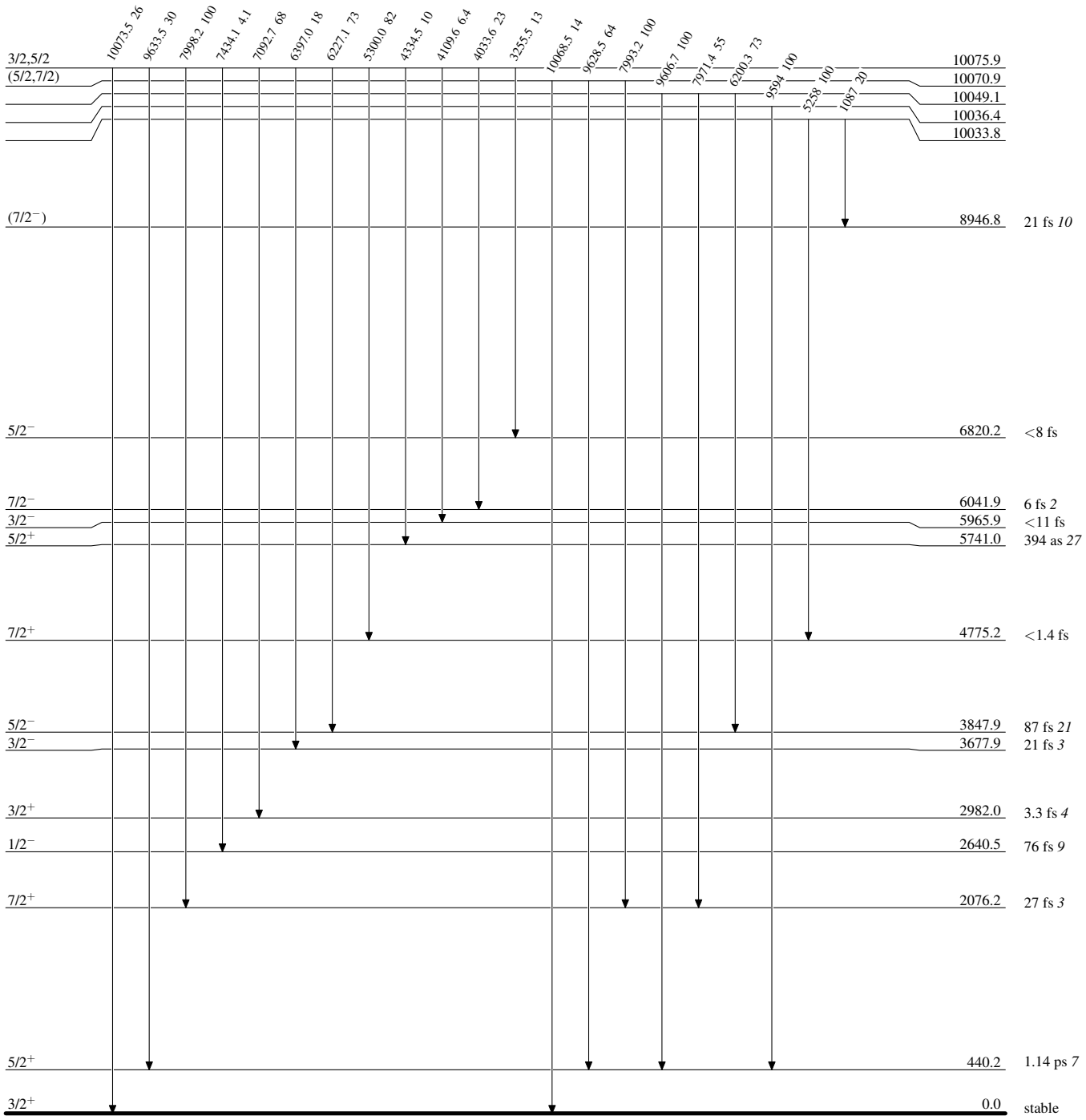


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

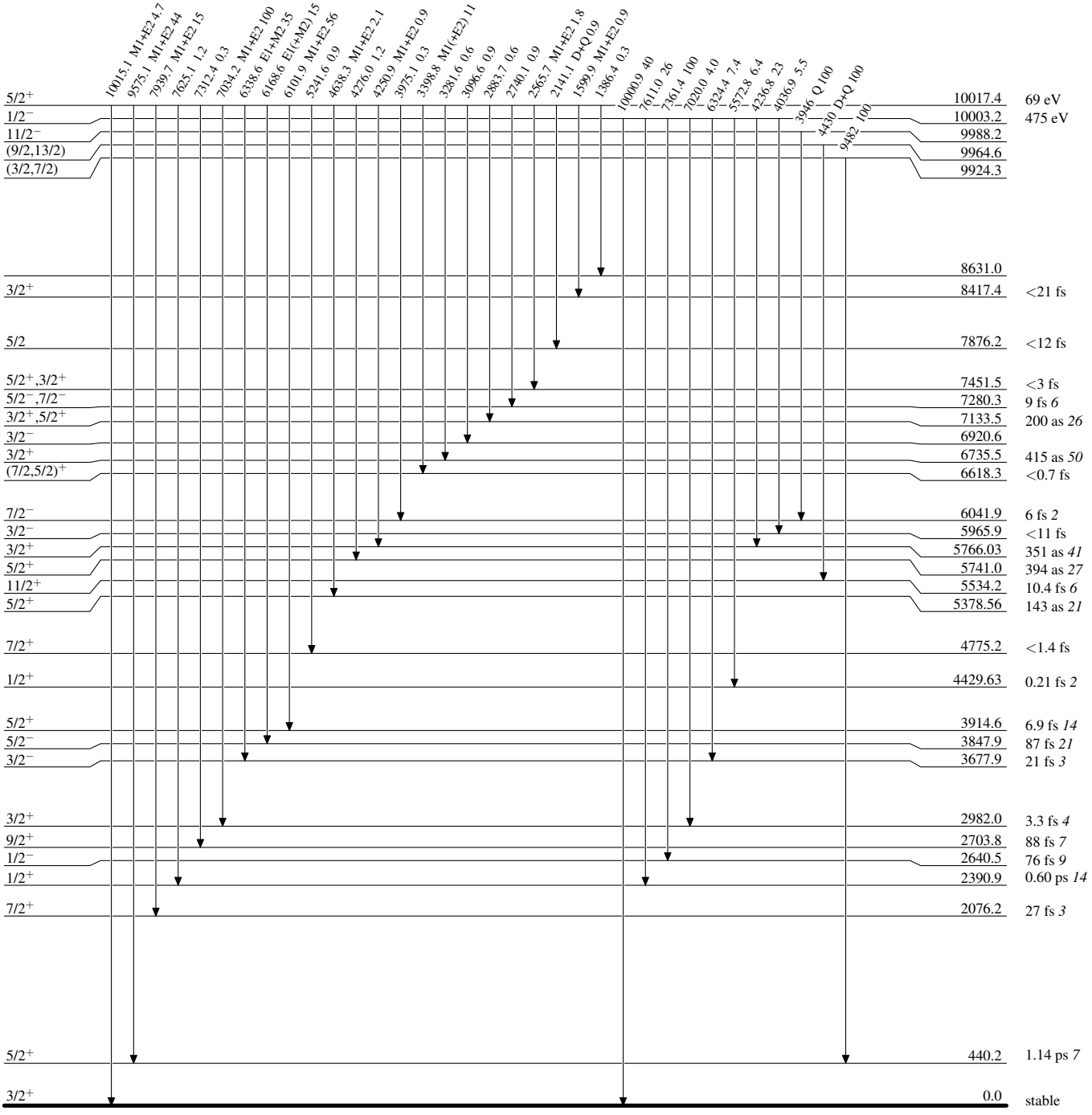


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

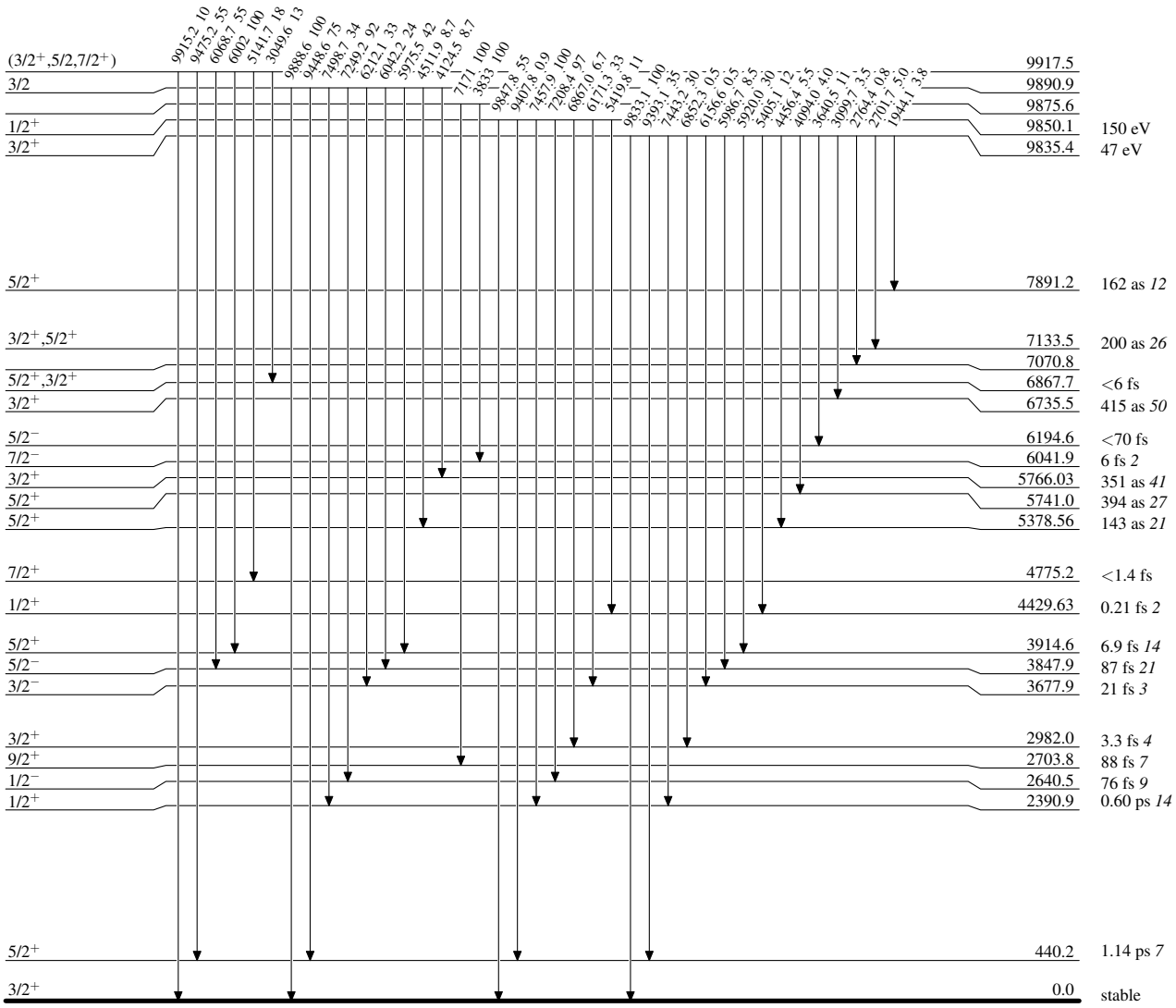


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

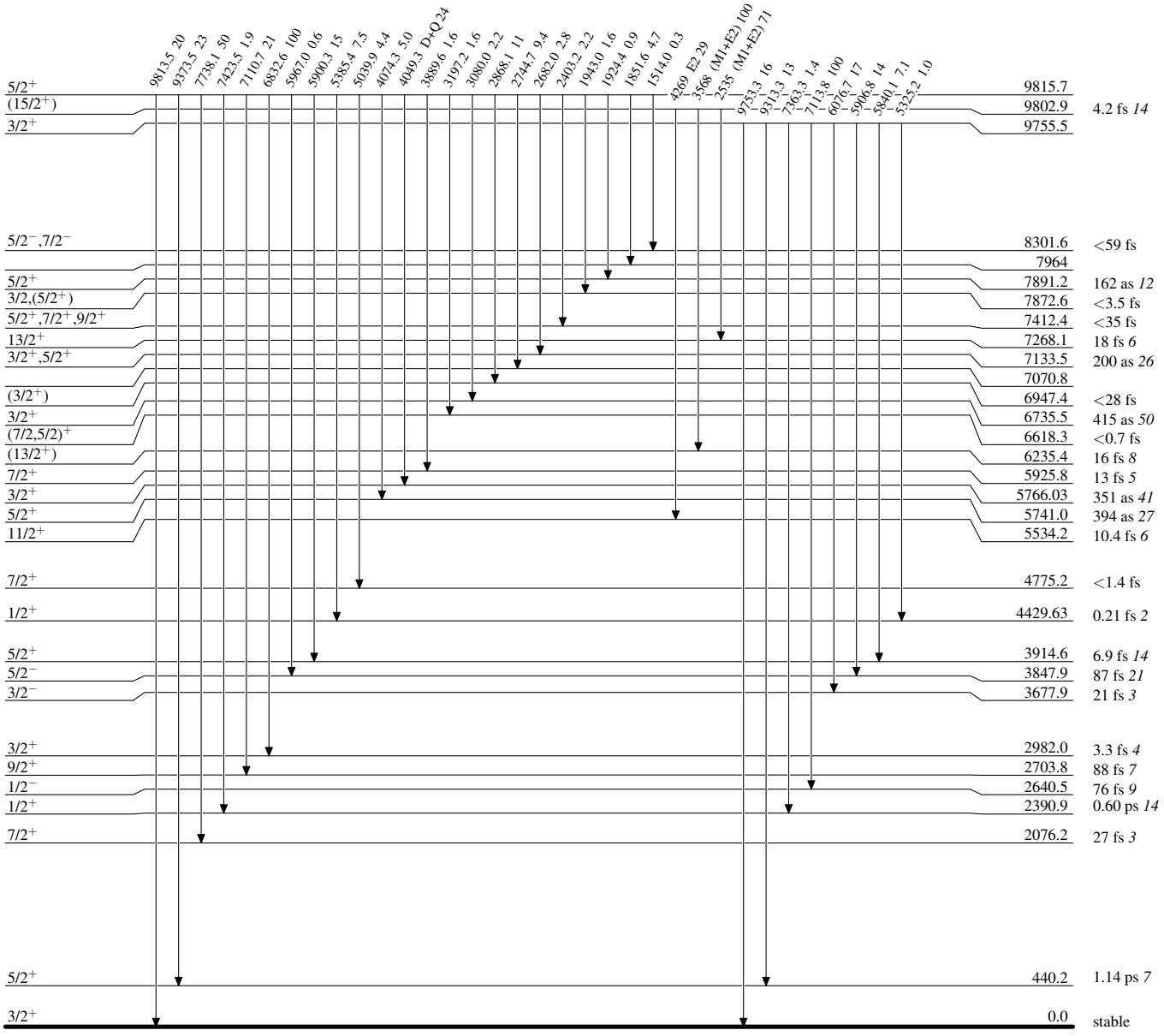


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

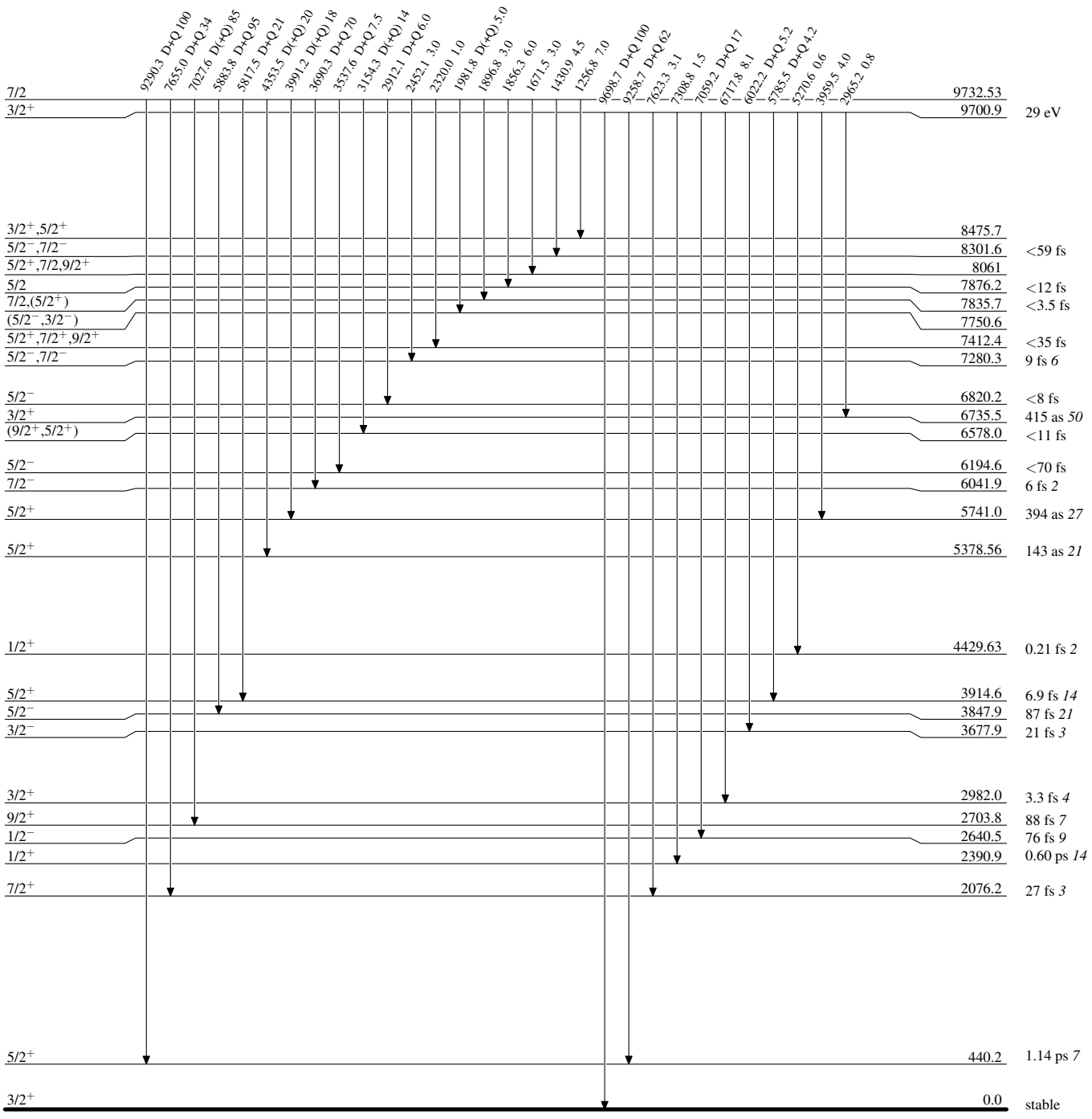


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



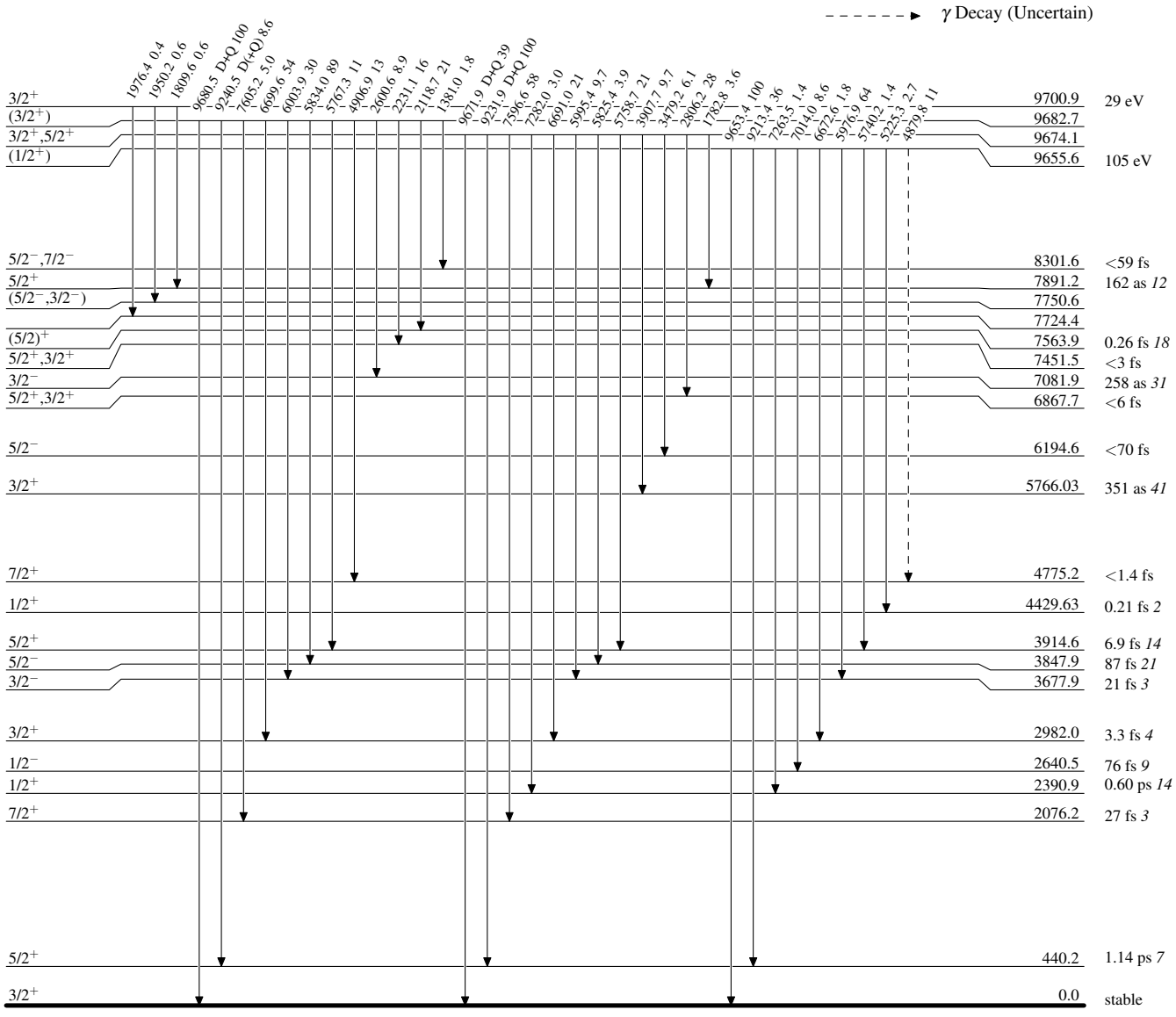
$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Legend

Intensities: Relative photon branching from each level

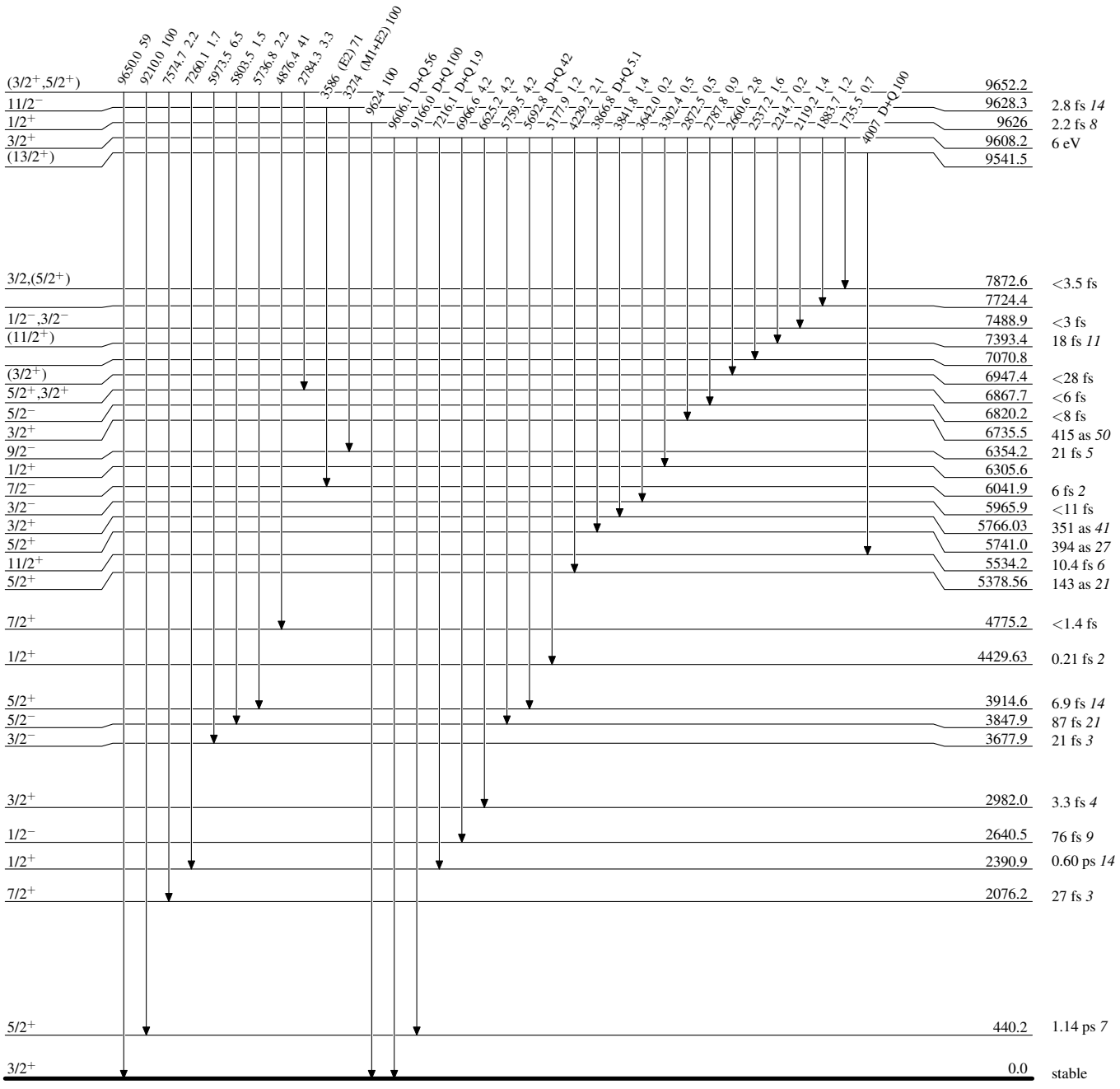


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

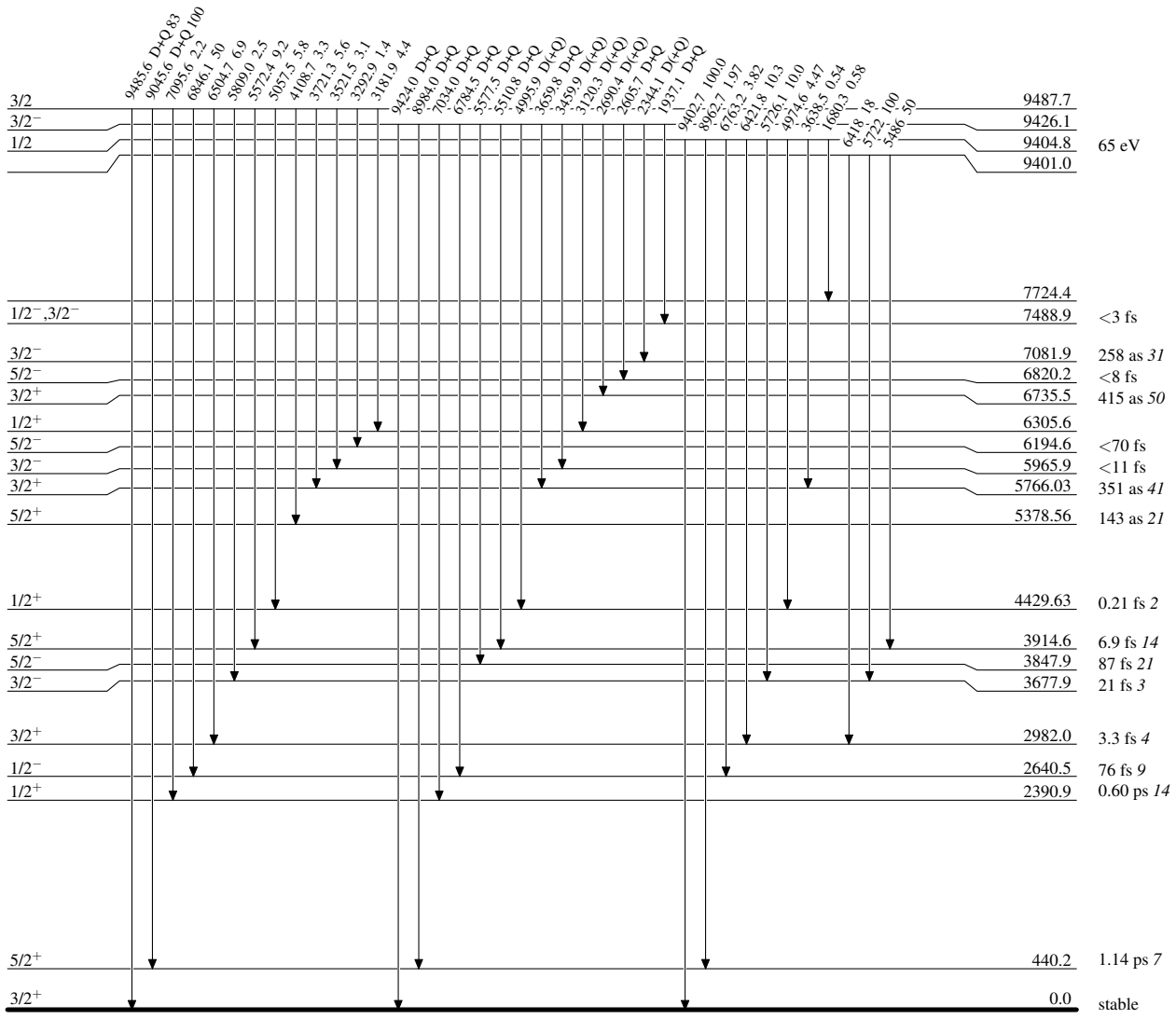


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

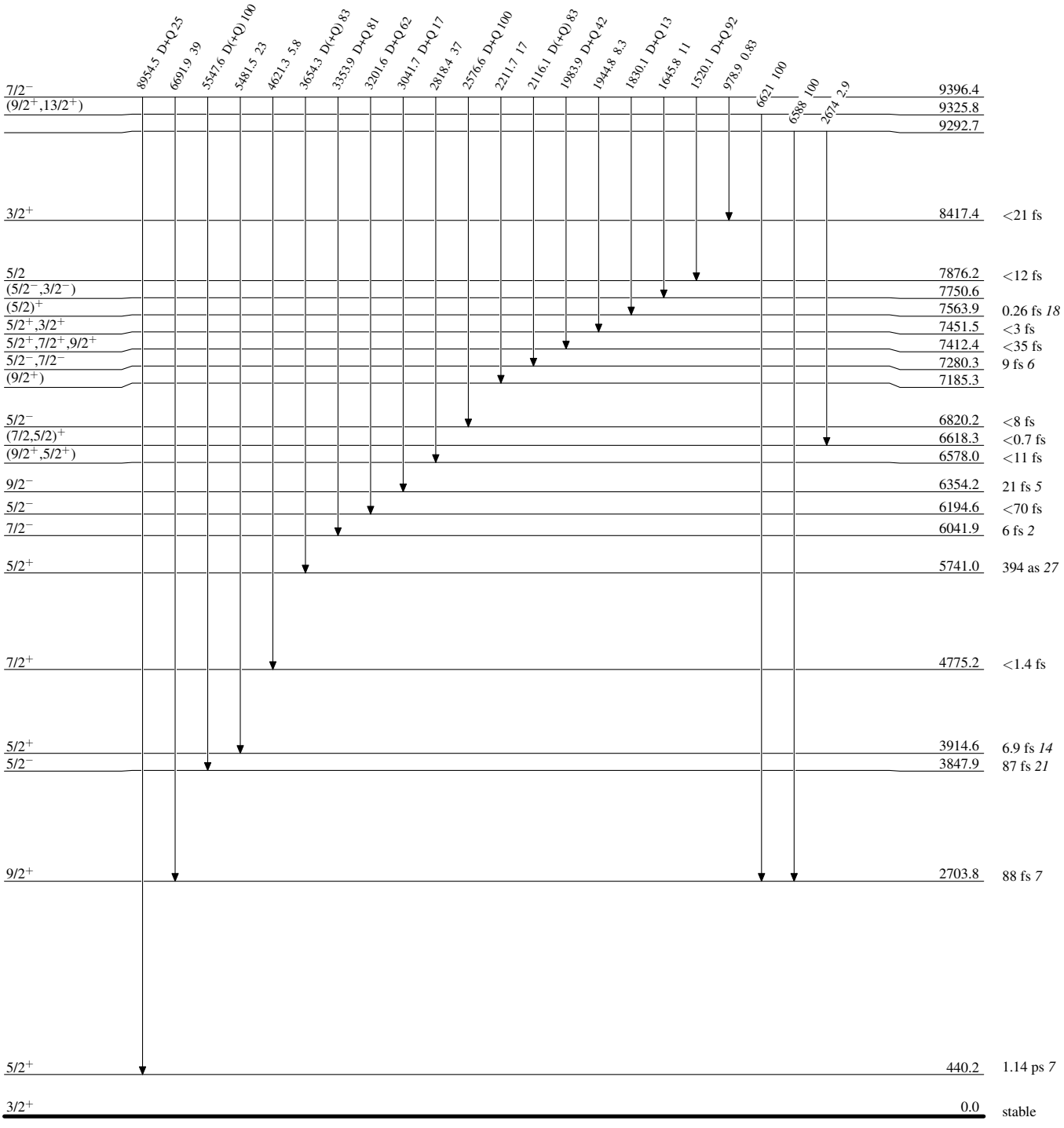


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{23}_{11}Na_{12}$

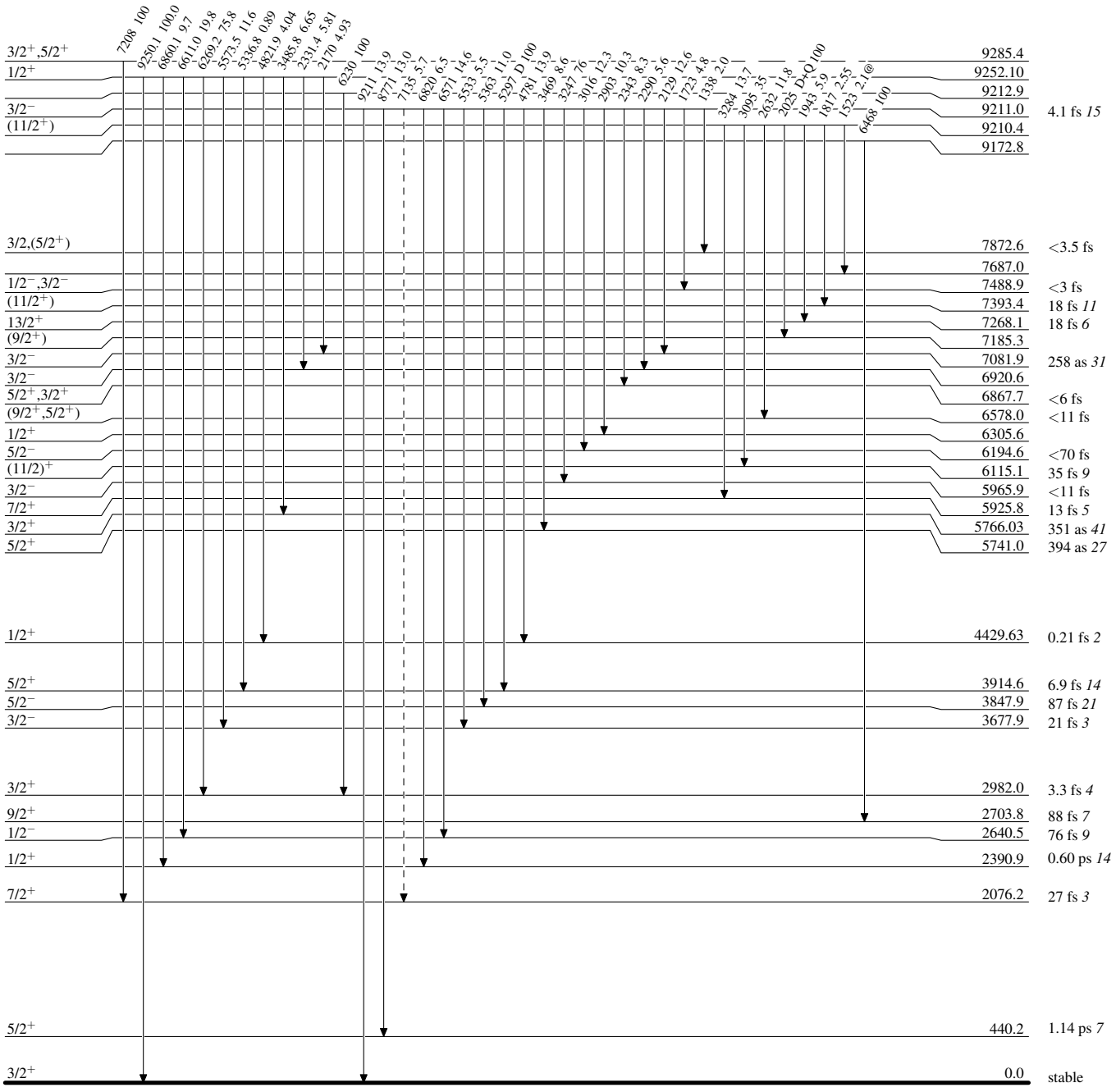
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)

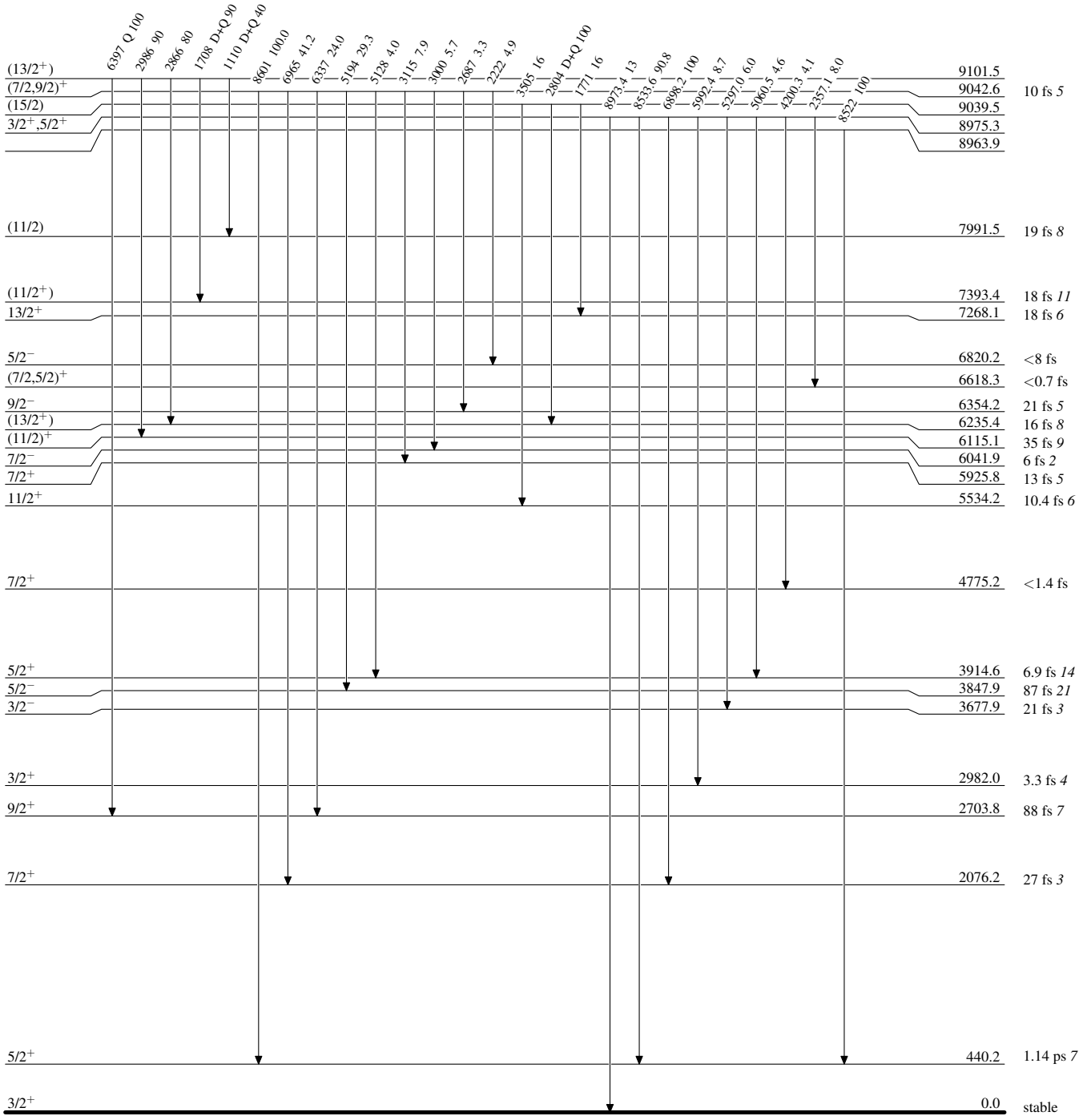


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

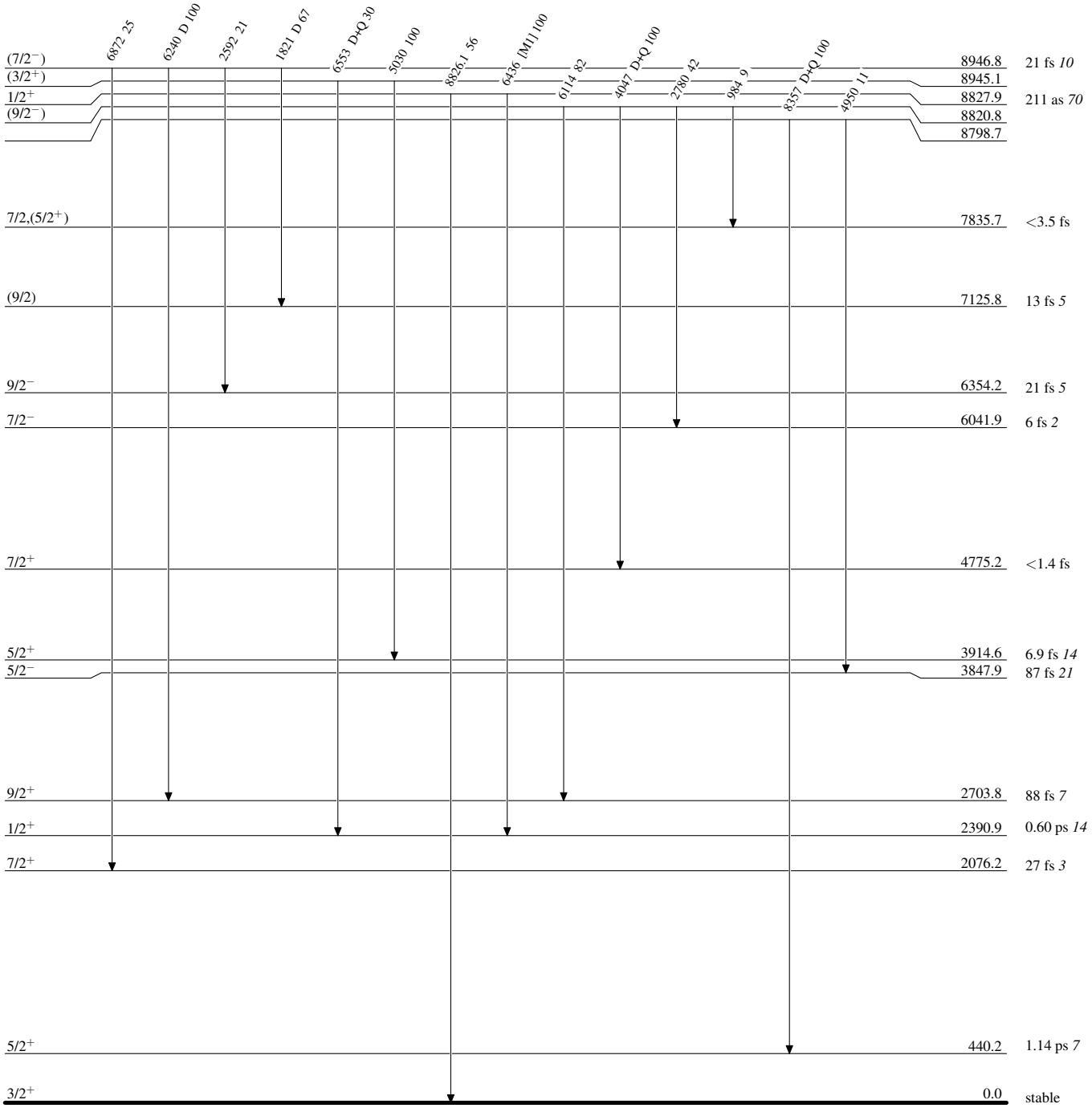


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{23}_{11}Na_{12}$

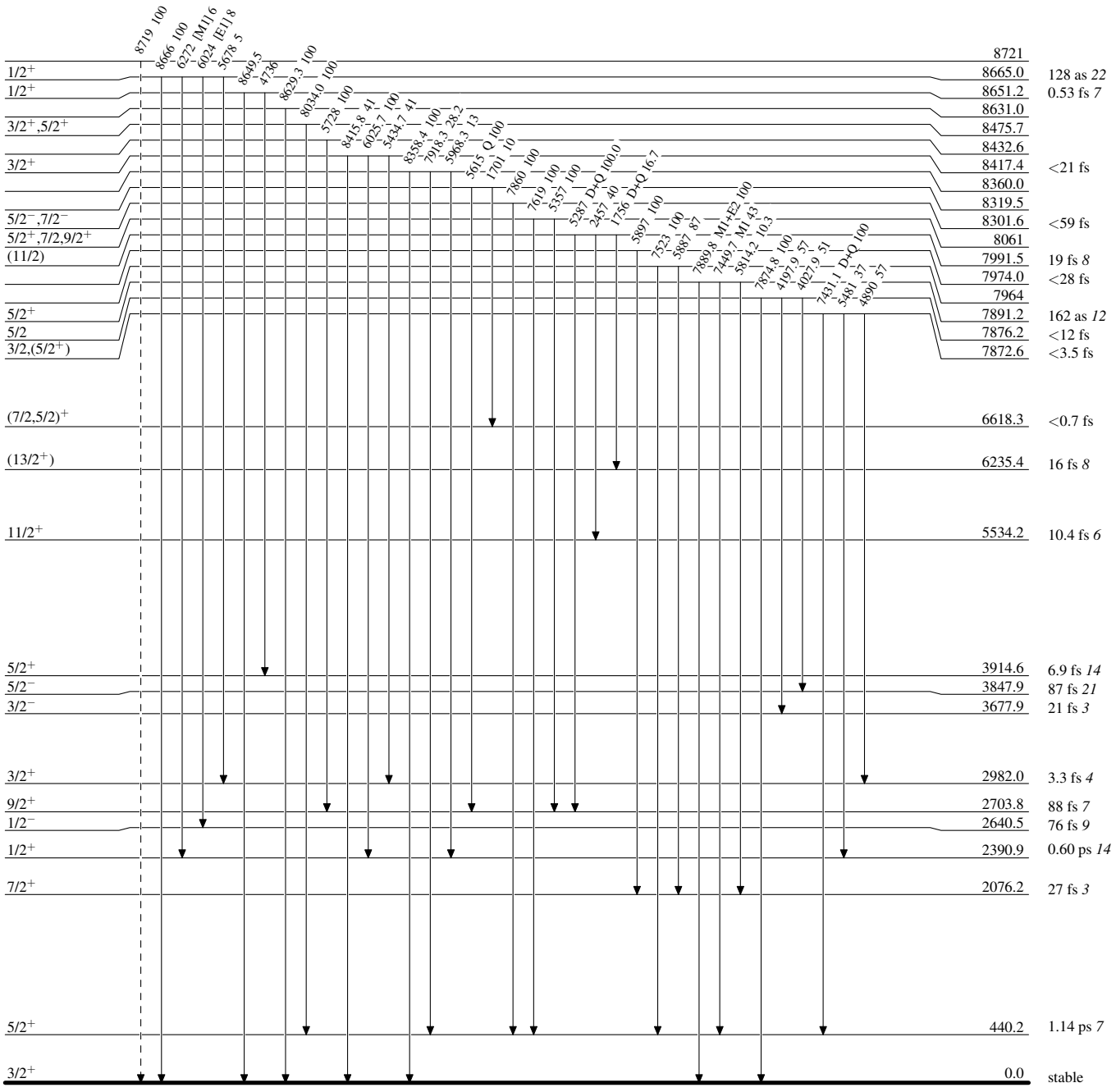
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

– – – – – – ► γ Decay (Uncertain)

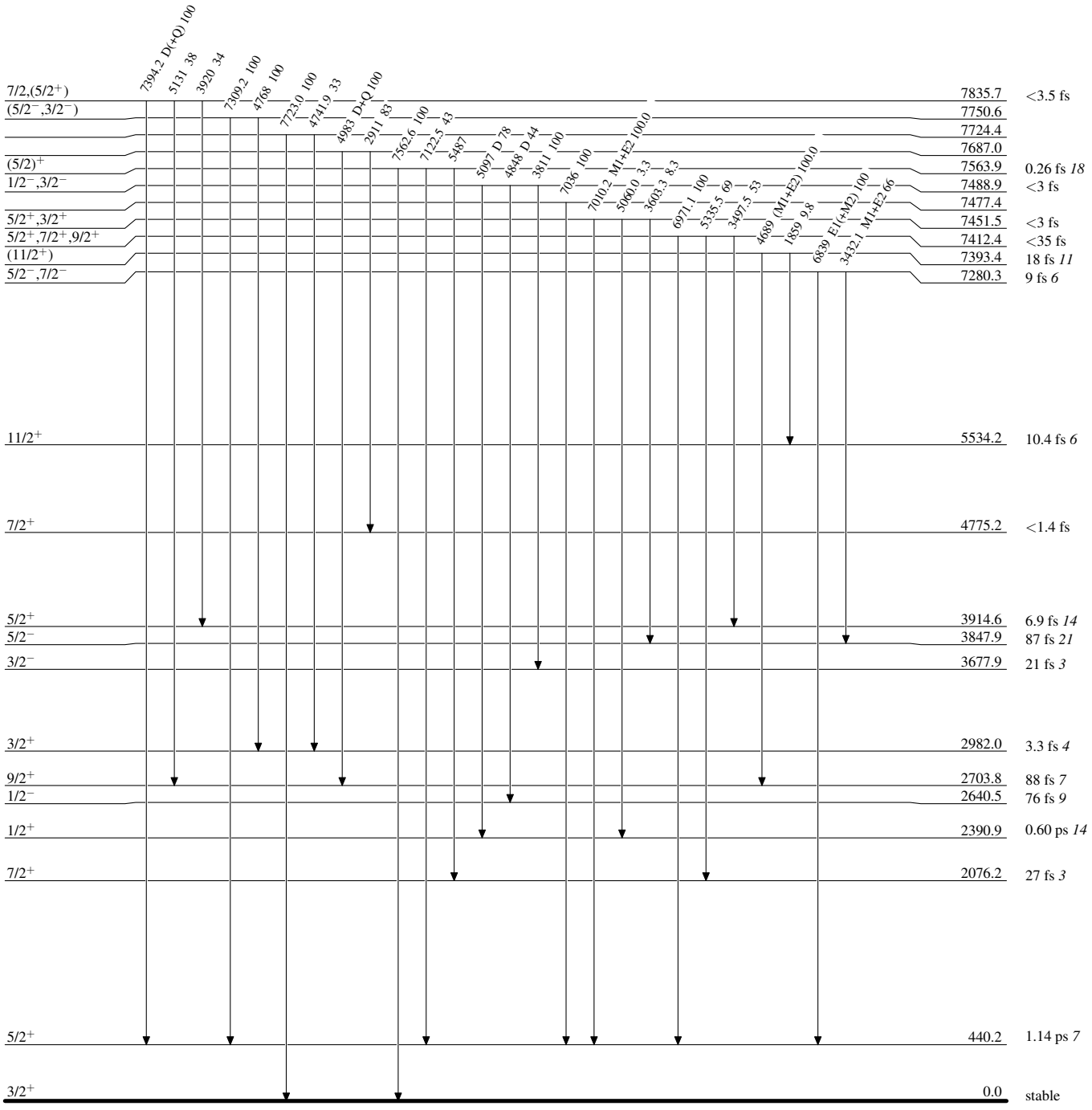


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

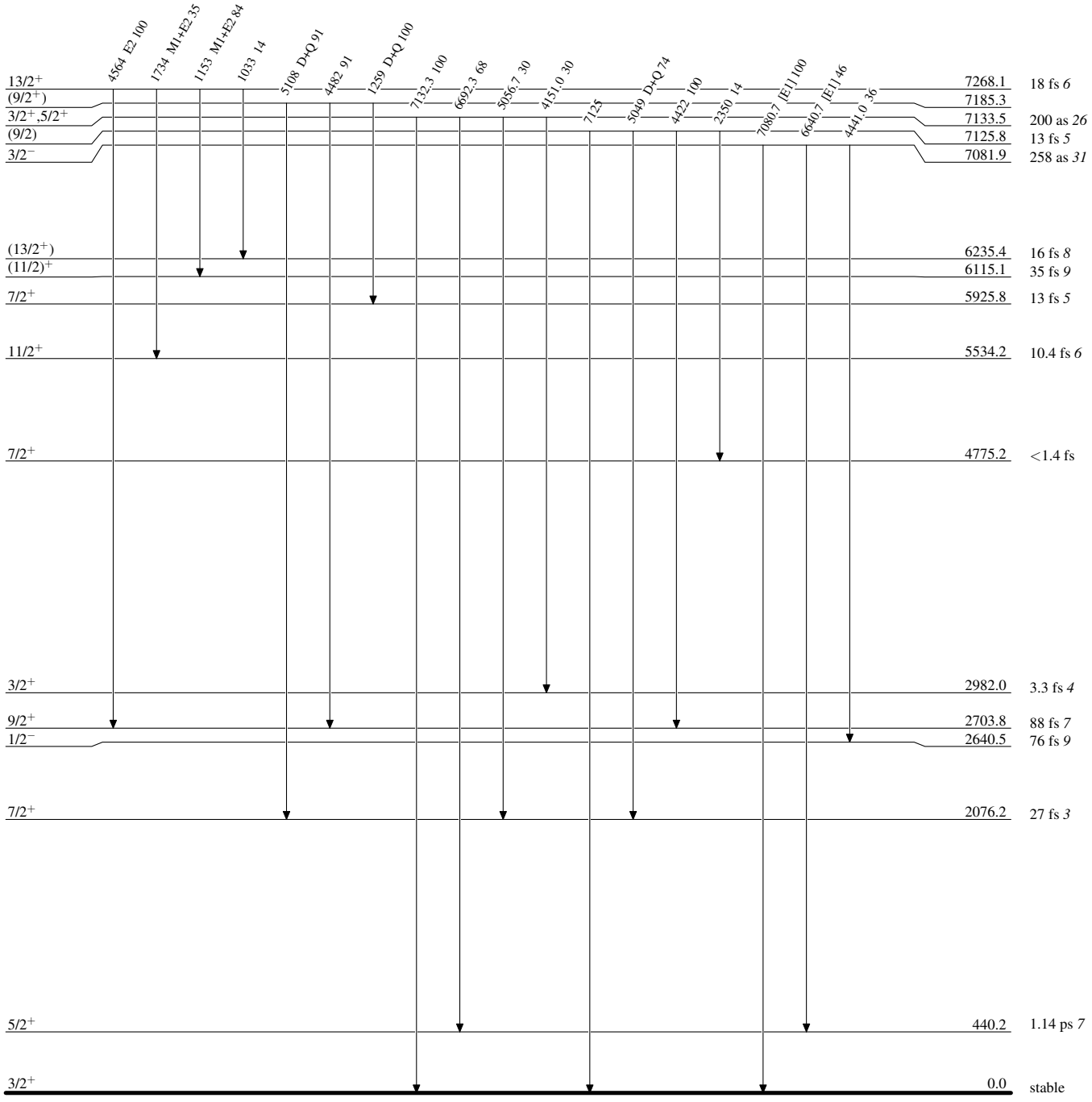


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

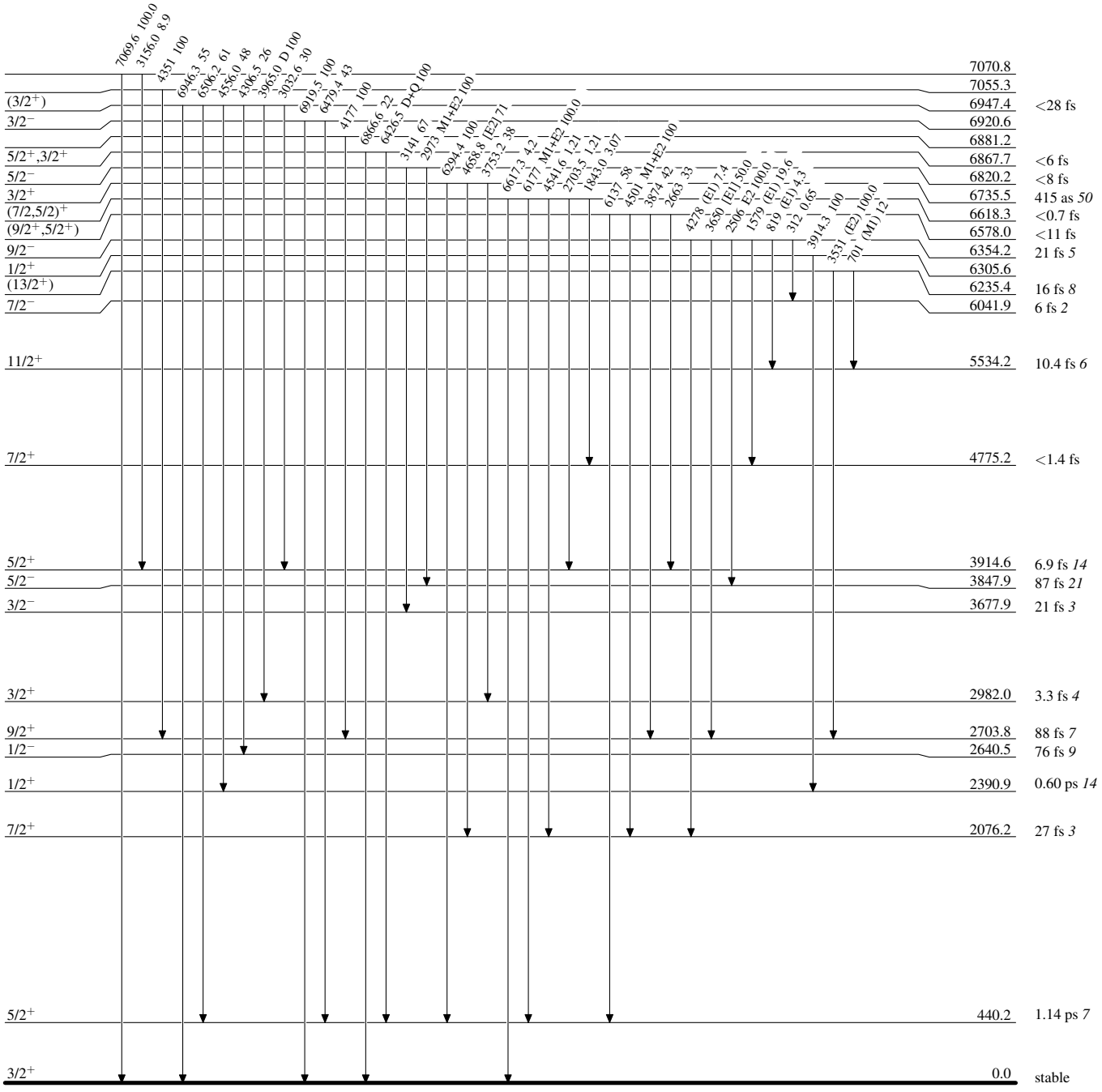


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

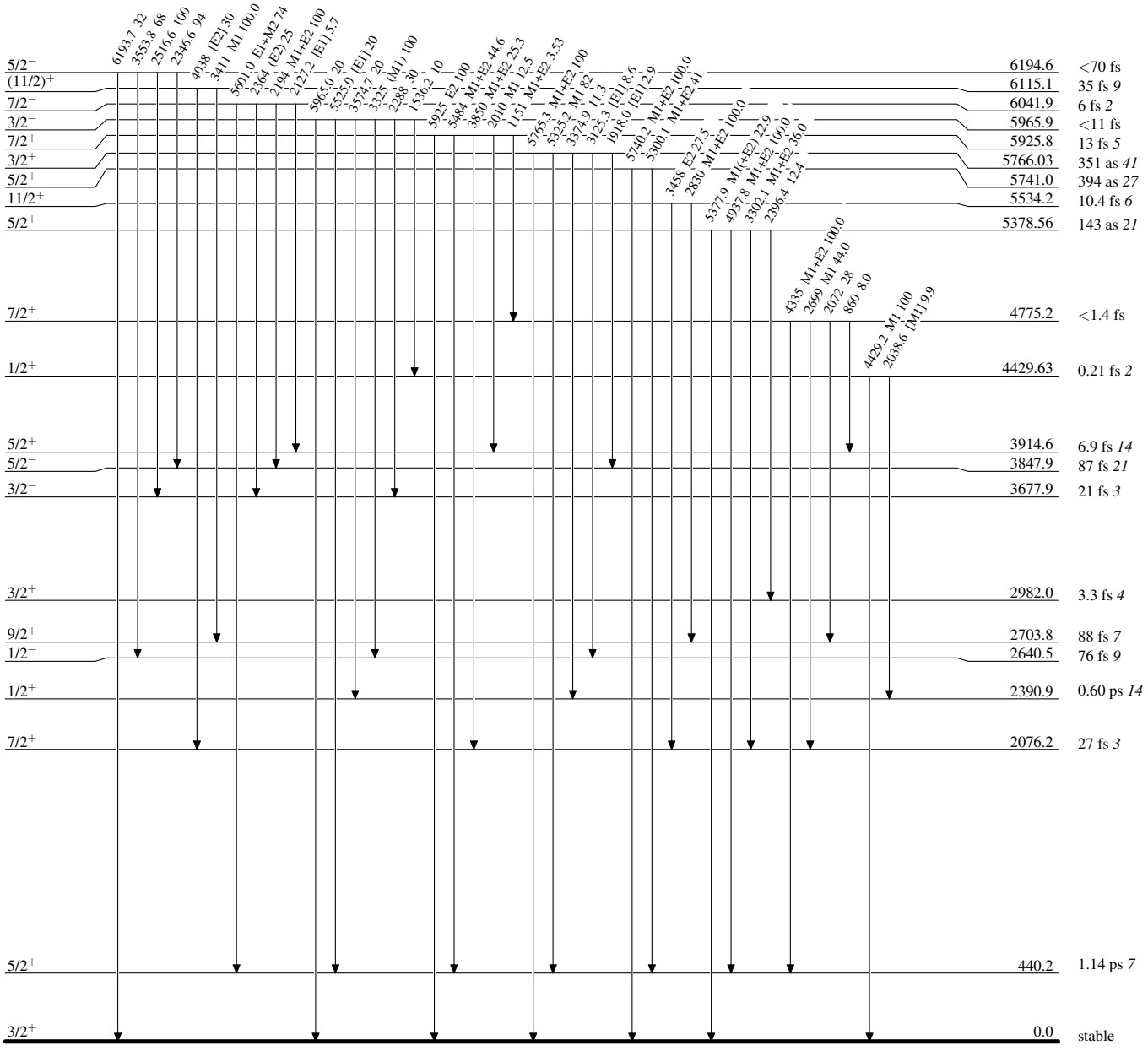


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

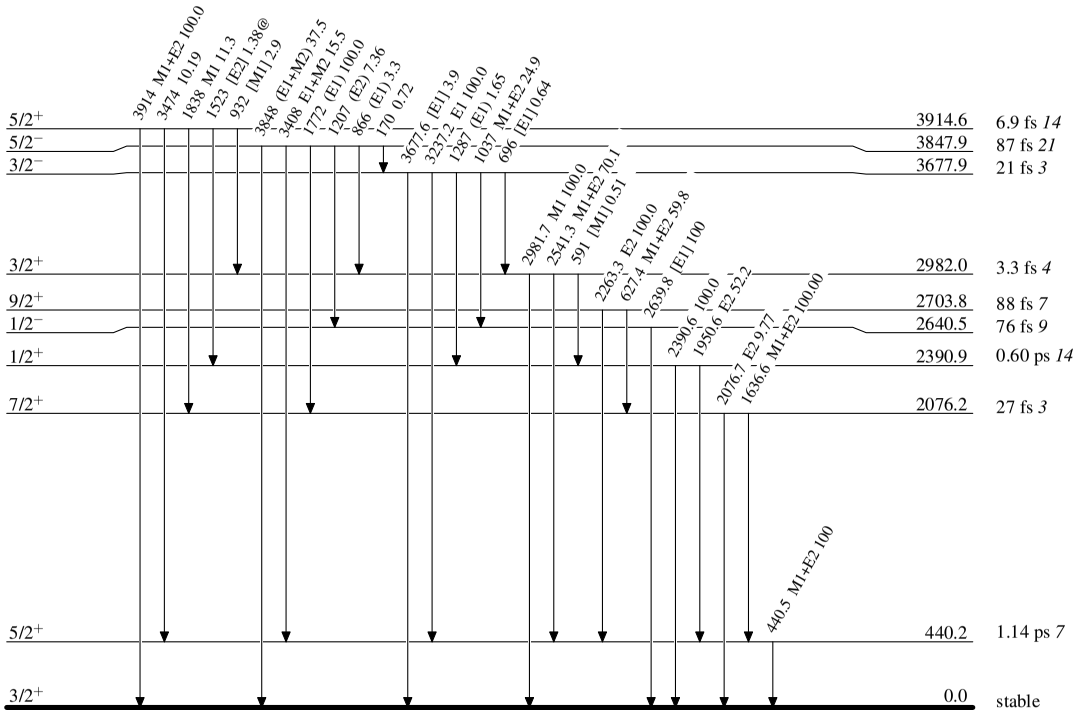


$^{23}_{11}Na_{12}$

Adopted Levels, Gammas

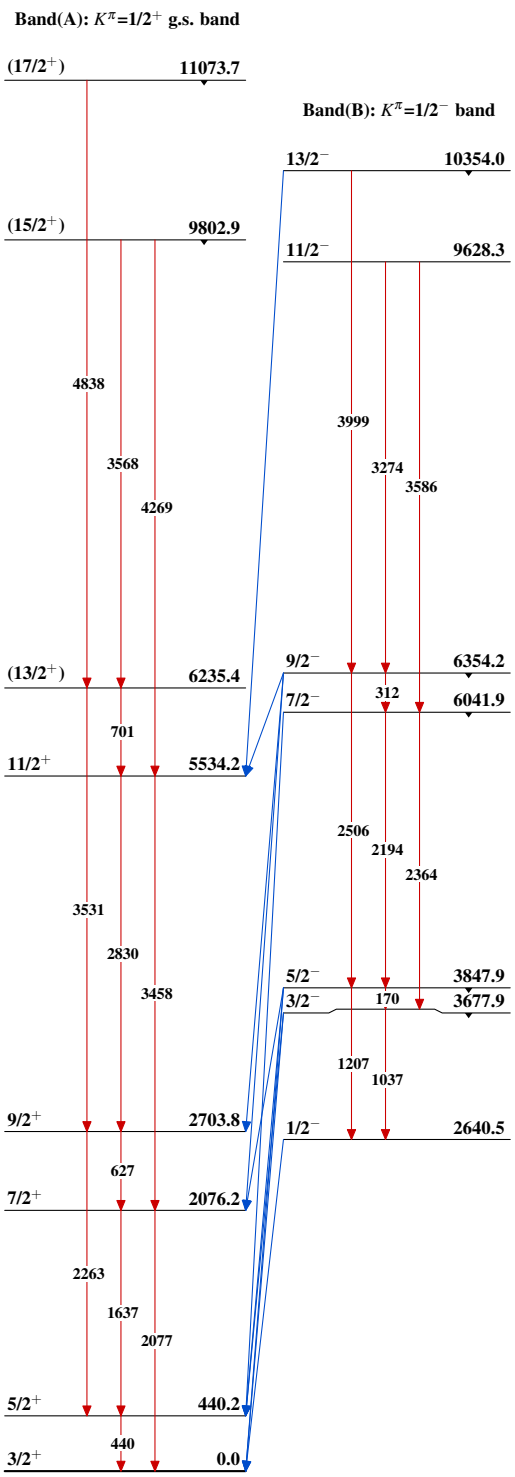
Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{23}_{11}Na_{12}$

Adopted Levels, Gammas



$^{23}_{11}Na_{12}$