Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 190,1 (2023)	20-Jun-2023

Q(β^-)=−3652.7 *18*; S(n)=11131.18 *23*; S(p)=12182.3 *5*; Q(α)=−8853.7 *3* 2021Wa16
S(2n)=19064.07 *29*, S(2p)=21624 *6* (2021Wa16).
^{44}Ca identification: 1923As04, 1925As02, 1935As01, 1938Ni04 using mass-spectrographic technique.
Other measurements and reactions:
Mesic atoms (pionic x rays): 1970Ku03, 1970Ma26, 1979Ba07, 1980Po01, 1983Ku10.
Mesic atoms (muonic x rays): 1966Co02, 1981Wo02.
Mesic atoms (kaonic x rays): 1971Ku08.
Isotope shifts: 2015Go24, 1976Ne08, 1978Br31, 1978Wo03, 1980Be13, 1982An15, 1982Ay02, 1983Lo13, 1984Pa12, 1986We08, 1991As06, 1992Ma20, 1998No10.
^{26}Mg(^{18}O,X) E=130 MeV: 1995Co22.
^{40}Ar(α,n): 1938Fu01: resonances.
Additional information 1.
^{26}Mg(^{18}O,xn): 1995Co22.
^{40}Ar(α,γ): 1976Fo04,1974Fo04.
^{42}Ca(^{48}Ti,^{46}Ti): 1986Br06,1988Br02; measured σ(E,θ).
1977Mu02,1993Mo10,1966Go38,1964Go13: ^{43}Ca(n,γ),(n,X) resonance. ≈50 ^{43}Ca+n resonances between 11133 and 11172 keV.
^{45}Sc(γ,p): 1995Is07,1993Is07,1982Ry01,1977Oi01,1975We11.
^{48}Ti(p,pα): 1981Ca02,1984Ca09.
^{42}Ca(^{48}Ti,^{46}Ti) E=385 MeV: 1986Br06.
^{45}Sc(p,2p): 1967Ru03 (E=156 MeV); 1969Ja12 (E=385 MeV).
Theoretical structure calculations:
2023Ha06: calculated levels, J^π using shell model with OXBASH code.
2022Wa13: calculated levels, J^π of the low-lying spectra in Bayesian neural network (BNN) approach.
2021Fu11: calculated energy levels, J^π, S(2n) using realistic shell model.
2019Wa31, 2015Wa37: calculated binding energy, S(2n), levels, J^π, yrast states, spectroscopic factors using shell model with CD-Bonn and Kuo-Brown (KB) interactions.
2017Va30: calculated levels, J^π using IBM, p-IBM and shell-model with KB3G interaction.
2016Im01: calculated low-lying levels, J^π using g.s. multiplets with seniority 2, 3 and 4 for pairing of nucleons in $1f_{7/2}$ shell.
2014Ho12: calculated ground-state energy in pf and $pfg_{9/2}$ shells, levels, J^π, B(E2), B(M1) using Chiral two- and three-nucleon interactions, and many-body perturbation theory (MBPT).
2012Ca13: calculated levels, J^π, orbital occupations, quadrupole moments, B(E2), magnetic moment using shell model with realistic interactions.
2012Ca27: calculated levels, J^π, B(E2), B(E3), two-quasi particle components for the first 2^+ and 3^- states using QRPA with iterative non-Hermitian Arnoldi diagonalization procedures.
2012Ut01: calculated energy levels, J^π, spectroscopic factors using large-scale shell-Model.
2010Le16: calculated levels, J^π, B(E2), wave function overlaps using shell Model with GXPF1A interaction.
1981Co09: calculated levels, J^π, spectroscopic factors using shell model with modified Kuo-Brown interaction.
1974Sk03: calculated levels, J^π, B(E2), spectroscopic factors, γ-branching ratios using an extended model for the mixing between 4p spherical and 6p-2h deformed configurations.
1973Ba23: calculated binding energy, levels, J^π, spectroscopic factors using shell model with a pairing-plus-surface-tensor interaction.
1973Mc10: calculated levels, J^π, spectroscopic factors, B(E2), B(M1) using shell model.
1972Fu02: calculated levels, J^π, B(E2), spectroscopic factors using shell model with Hamada-Johnston, and Tabakin interactions.
1970Fe06: calculated levels, J^π, binding energy, spectroscopic factors using shell model with effective interactions.
Theoretical calculations: about 343 primary references for structure calculations from 1970 to 2023, and six references for double-β decay can be retrieved from the NSR database at www.nndc.bnl.gov/nsr/.

Adopted Levels, Gammas (continued)

^{44}Ca Levels

Cross Reference (XREF) Flags

A	^{44}K β^- decay (22.13 min)	M	^{43}Ca(n,γ) E=thermal	Y	^{44}Ca(^{6}Li,^{6}Li′)
B	^{44}Sc ε decay (4.0420 h)	N	^{43}Ca(n,γ),(n,n):resonances	Z	^{44}Ca(^{7}Li,^{7}Li)
C	^{44}Sc ε decay (58.61 h)	O	^{43}Ca(d,p)	Others:	
D	^{27}Al(^{19}F,2pγ)	P	^{44}Ca(γ,γ'),(pol γ,γ')	AA	^{44}Ca(^{9}Be,^{9}Be′)
E	^{30}Si(^{16}O,2pγ)	Q	^{44}Ca(e,e′)	AB	^{44}Ca(^{16}O,^{16}O′)
F	^{30}Si(^{18}O,2p2nγ)	R	^{44}Ca(π^+,$\pi^{+\prime}$),(π^-,$\pi^{-\prime}$)	AC	^{44}Ca(^{18}O,^{18}O′)
G	^{36}S(^{14}C,α2nγ)	S	^{44}Ca(n,n′γ)	AD	^{45}Sc(μ^-,nγ)
H	^{40}Ar(^{6}Li,d)	T	^{44}Ca(p,p′),(pol p,p′)	AE	^{45}Sc(d,^{3}He),(pol d,^{3}He)
I	^{41}K(α,pγ),(α,p)	U	^{44}Ca(p,p′γ)	AF	^{45}Sc(t,α)
J	^{42}Ca(t,p)	V	^{44}Ca(d,d′)	AG	^{46}Ti(^{14}C,^{16}O)
K	^{42}Ca(α,^{2}He)	W	^{44}Ca(^{3}He,^{3}He′),(pol ^{3}He,^{3}He′)	AH	^{48}Ti(d,^{6}Li)
L	^{42}Ca(^{48}Ti,^{46}Ti)	X	^{44}Ca(α,α')	AI	Coulomb excitation

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[c]	0$^+$	stable	ABCDEFGHIJK M OPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI The rms charge radius <r^2>$^{1/2}$=3.5179 fm *21* (2013An02 evaluation). Evaluated change in charge radius δ<r^2>(^{44}Ca−^{40}Ca)=+0.283 fm^2 *6* (2013An02). δ<r^2>(^{40}Ca−^{44}Ca)=0.288 fm^2 *2*(stat)*6*(syst) (2016Ga34), 0.2904 fm^2 *10* (1998No10). $\delta\nu$(^{40}Ca-^{44}Ca)=851.1 MHz *6*(stat)*21*(syst) (2016Ga34). J$^\pi$: L(t,p)=L(α,^{2}He)=L(^{6}Li,d)=L(d,^{6}Li)=0 from 0$^+$. Adopted (1977En02) spectroscopic factors S: 3.1 *3* (L=3) (neutron stripping); 0.50 *13* (L=3) (proton pickup).
1157.0208[c] *30*	2$^+$	2.94 ps *12*	ABCDEFGHIJ M OPQRSTUVWXY	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI μ=+0.34 *6* (2003Sc21,2020StZV) Q=−0.14 *7* (1973To07,2021StZZ) B(E2)↑=0.0475 *20* J$^\pi$: L(t,p)=L(^{6}Li,d)=L(α,α')=L(d,d′)=L(p,p′)=L(e,e′)=2 from 0$^+$. T$_{1/2}$: weighted average of 3.5 ps *7* from DSAM in (α,pγ); 2.0 ps *+8−5* from DSAM in (p,p′γ); 3.05 ps *28* from DSAM in Coul. ex. (2003Sc21); 3.19 ps *27* from DSAM in Coul. ex. (1973Fi15); and 2.88 ps *12* from adopted B(E2)↑=0.0475 *20* in Coulomb excitation. μ: from transient field method in 2003Sc21. Q: from Coulomb excitation in 1973To07. B(E2)↑: weighted average of 0.0550 *20* (1989It02) and 0.048 *3* (1971He08) in (e,e′), 0.0475 *36* (2016Ca17), 0.0473 *20* (1973To07) and 0.049 *5* (1972Bi17) in Coulomb excitation. Adopted (1977En02) spectroscopic factors S: 0.41 *11* (L=3) and 0.08 *2* (L=1) (neutron stripping); 0.18 *3* (L=3) (proton pickup).
1570?	2$^+$		W	E(level): from (pol ^{3}He,^{3}He′) only; this level is not seen in other studies.

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
1883.516 *13*	0^+	13.9 ps *42*	A HIJ M OPQR TUVWX	Jπ: from analyzing power in (pol ^{3}He,^{3}He′). XREF: Others: AB, AE, AF, AG, AH XREF: J(1903)X(1890?). Jπ: L(^{6}Li,d)=L(d,^{6}Li)=0 from 0^+; p-1883γ(θ) is isotropic in (p,p′γ). $T_{1/2}$: other: >1.4 ps from DSAM in (p,p′γ). Adopted (1977En02) spectroscopic factors S: 0.39 *10* (L=3) (neutron stripping); 0.12 *3* (L=3) (proton pickup).
2030?	2^+		K	E(level): from (α,^{2}He) only; this level is not seen in other studies. Jπ: L(α,^{2}He)=2 from 0^+.
2283.119[c] *10*	4^+	1.9 ps *7*	A CDEFGHIJ M O QR TUV X	XREF: Others: AB, AD, AE, AF, AG, AH, AI Jπ: L(^{6}Li,d)=L(e,e′)=L(p,p′)=L(α,α′)=4 from 0^+. $T_{1/2}$: others: 2.6 ps from B(E2)↑(from 2^+,1157)=0.021 in (^{16}O,^{16}O′); 16 ps *5* from RDM in (^{19}F,2pγ) is discrepant. Adopted (1977En02) spectroscopic factors S: 0.14 *4* (L=3) and 0.01 *1* (L=1) (neutron stripping); 0.09 *3* (L=3) (proton pickup).
2656.509 *11*	2^+	30 fs *3*	AB F HIJ M OPQR TUV X	XREF: Others: AB, AD, AE, AF, AG, AH, AI B(E2)↑=0.0079 *7* (1989It02) XREF: AI(2657?). Jπ: L(^{6}Li,d)=L(t,p)=L(p,p′)=L(α,α′)=2 from 0^+. $T_{1/2}$: from B(E2) in (e,e′) in 1989It02. B(E2)↑: from 1989It02 in (e,e′). Adopted (1977En02) spectroscopic factors S: 0.51 *13* (L=3) and <0.02 (L=1) (neutron stripping); 0.19 *3* (L=3) (proton pickup).
3044.292 *33*	4^+	4.6 ps *+13−10*	A FGHIJ M O TU X	XREF: Others: AB, AF, AG, AH Jπ: L(t,p)=L(α,α′)=4 from 0^+. Adopted (1977En02) spectroscopic factors S: 0.91 *23* (L=3) (neutron stripping); <0.04 (L=3) (proton pickup).
3285.004[c] *22*	6^+	13.3 ps *12*	CDEFG IjK M T	XREF: Others: AH XREF: j(3298)K(3290)ah(3300). Jπ: L(α,^{2}He)=6 from 0^+; 1001.869γ, ΔJ=2 to 4^+. $T_{1/2}$: other: <17 ps from RDM in (^{19}F,2pγ), <0.76 ns from γγ(t) in (n,γ) E=thermal.
3301.36 *4*	2^+	35 fs *18*	AB Ij M OP TU	XREF: Others: AH XREF: j(3298)ah(3300). Jπ: 3301.33γ E2 0^+.
3307.872 *10*	3^-	0.15 ps *6*	AB F j M OPQR TUV X	XREF: Others: AB, AF, AG, AH B(E3)↑=0.0072 *12* XREF: j(3298)ah(3300). Jπ: L(e,e′)=L(p,p′)=L(d,d′)=L(α,α′)=3 from 0^+. $T_{1/2}$: from adopted B(E3)↑=0.0072 *12* and γ-branching ratios. Other: <0.35 ns from γγ(t) in (n,γ) E=thermal. B(E3)↑: unweighted average 0.0095 *9* (1989It02) and 0.00559 *23* (1971He08) in (e,e′), 0.0065 *9* (1969BeYW) in (α,α′).

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
3357.29 *11*	(2+,3,4+)	<28 fs	A IJ M O TU X	XREF: Others: AE, AF XREF: AE(3370). Jπ: 1074γ to 4+, 2200γ to 2+. L(d,^{2}He)=2 from 0+ for a 3370 group suggest π=−, but L(t,α)=3 from 7/2− for a 3360 group suggests π=+.
3581.3 *10*	0+		A H J O TU	XREF: Others: AH XREF: J(3592). Jπ: L(d,^{6}Li)=L(^{6}Li,d)=0+ from 0+.
3661.527 *10*	1−[&]		A j OP TU X	XREF: Others: AF XREF: j(3671)af(3670). Jπ: 3661γ D to 0+; 353.67γ to 3− is not M2 since it would require a $T_{1/2}$>0.3 ns or width Γ<1.5×10$_6$ eV which is significantly smaller than observed Γ_γ=0.08 eV in (γ,γ′). $T_{1/2}$: 5.8 fs from Γ_γ=0.08 eV in (γ,γ′), but it would require a B(E2)(W.u.)(354γ)=3800 exceeding RUL=100, which constrains $T_{1/2}$>0.22 ps or a width Γ<0.0021 eV.
3676.092 *14*	(2+)		A j M O TU	XREF: Others: AF XREF: j(3671)af(3670). Jπ: 3676.7γ to 0+, 368.2γ to 3−; L(p,p′)=(2) from 0+.
3691.7 *4*	1[&]	46[@] fs +*30*−*13*	P	
3711.96[d] *9*	4−	<0.42 ns	A F M O T	XREF: Others: AF XREF: O(3729). Jπ: L(t,α)=2 from 7/2−; 404.26γ D, ΔJ=1 to 3−; 1428.67γ ΔJ=0 to to 4+.
3776.27 *11*	2−	<0.69 ns	A M O TU	XREF: Others: AE, AF XREF: O(3792)AF(3770?). Jπ: spin=2 from pγ(θ) in (p,p′γ); L(d,^{3}He)=2 from 7/2−.
3880 *10*			O	
3913.80[e] *8*	5−	>2 ps	FG M Q T X	XREF: Others: AB, AF, AH B(E5)↑=0.000083 *15* XREF: af(3915)ah(3920). Jπ: L(e,e′)=L(α,α′)=5 from 0+. $T_{1/2}$: from DSAM in (^{14}C,α2nγ). B(E5)↑: unweighted average of 0.000096 *8* (1989It02) and 0.000053 *5* (1971He08) in (e,e′), and 0.000101 *16* (1969BeYW) in (α,α′).
3922.71 *10*	5−	<0.56 ns	F M T	XREF: Others: AF, AH XREF: F(?)af(3915)ah(3920). Jπ: L(p,p′)=5 from 0+; and γ's to 4+ and 6+.
3934? *10*	(2+,3+,4+,5+)		O	Jπ: L(d,p)=(1) from 7/2−.
4011.4 *4*			M O T	XREF: Others: AF XREF: O(4026)AF(4022).
4092.04 *13*	(6+)		F M o x	XREF: Others: AF XREF: o(4104)x(4091)af(4099). Jπ: 1809γ (Q), ΔJ=(2) to 4+.
4093.7 *4*	(2+,3,4+)		A o x	XREF: Others: AF

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
				XREF: o(4104)x(4091)af(4099).
				E(level): this level is probably different from 4092 level (see discussion in 1976Co06 in ^{44}K β^- decay).
				Jπ: 1810.4γ to 4^+, 2937.8γ to 2^+.
4170 *5*	(2^+)		T X	XREF: Others: AH
				XREF: X(4169?)AH(4170).
				E(level): from (p,p′).
				Jπ: L(α,α′)=(2) from 0^+.
4196.10 *22*	2^+	50 fs *+13−8*	M OP TU	XREF: O(4207).
				Jπ: L(d,p)=1 from $7/2^-$; ΔJ=2 to 0^+ from pγ(θ) in (p,p′γ). But J=1 is expected from population in (γ,γ′), although, a 2^+ level could also be populated weakly either directly or from deexcitation of a higher J=1 level.
				$T_{1/2}$: from 30 fs $^{8-5}$ deduced from $\Gamma_{\gamma 0}$ for J=1 in (γ,γ′) with a correcting factor of 5/3 due to the change of spin from 1 to 2, since $(2J+1)\Gamma_{g0}$ is proportional to measured γ-ray yield (2011Is01). Other: <0.69 ns from γγ(t) in (n,γ) E=thermal.
4260.27 *35*	$(2^+,3)$		A	Jπ: $(2^+,3,4^+)$ from γ's to 2^+ and 4^+; 4^+ excluded by β-decay from 2^-.
4315.22 *14*	(1,2,3)		A	XREF: Others: AF
				XREF: AF(4310?).
				Jπ: from β-decay from 2^-, log *ft*=7.04.
4358.440 *30*	3^-		A J M Q T X	XREF: Others: AF
				Jπ: L(α,α′)=3 from 0^+.
4399.2 *5*	3^-		A j M O qr T X	XREF: Others: AB, AF, AH
				XREF: j(4396)O(4410)q(4390)r(4400)ab(4399)af(4400)ah(4400).
				Jπ: L(p,p′)=L(α,α′)=3 from 0^+.
4409.176 *14*	$(1)^-$		A j qr T	XREF: Others: AB, AF, AH
				XREF: j(4396)q(4390)r(4400)ab(4399)af(4400)ah(4400).
				Jπ: allowed β-decay from 2^-, log *ft*=5.63; 4408.9γ to 0^+.
4436.7 *5*	$(1,2^+)$		A	Jπ: 4437γ to 0^+.
4479.9 *5*	2^+		J M O T X	XREF: Others: AE, AF
				XREF: O(4491?).
				Jπ: L(t,p)=L(α,α′)=2 from 0^+. But 3^-,4^- from L(d,^{3}He)=0 from $7/2^-$ for a group at 4480 is inconsistent.
4552.644 *23*	$(3)^-$		A j T	XREF: Others: AH
				XREF: j(4562)ah(4550).
				Jπ: allowed β-decay from 2^-, log *ft*=5.63; 2268.5γ to 4^+.
4561.8? *6*			A	XREF: A(?).
4564.87 *14*	(5^-)		F jK M o Q T X	XREF: Others: AF, AH
				XREF: F(?)j(4562)K(4550)o(4569)af(4565)ah(4550).
				Jπ: L(α,α′)=L(p,p′)=(5) from 0^+. L(α,^{2}He)=7 for a 4550 group.
4572.6 *5*	(1,2,3)		A j o	XREF: Others: AF, AH
				XREF: j(4562)o(4569)af(4565)ah(4550).
				Jπ: β-decay from 2^- parent, log *ft*=7.0 *3*.
4584.08 *18*	$(2^+,3,4^+)$	<3.5 ns	M O T X	XREF: O(4598).
				Jπ: 3427.5γ to 2^+ and 1539.4γ to 4^+.

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
4616 *10*			O	
4649.46 *10*	1&	7.4@ fs *+16−11*	P	XREF: Others: AF XREF: af(4660).
4650.3 *4*	2+		A J M O T X	XREF: Others: AB, AF XREF: O(4662)af(4660). Jπ: L(t,p)=L(α,α′)=2 from 0+.
4690.0 *5*	(1−,2,3,4+)		M O	Jπ: 3332.9γ to 2+; primary γ from 3−,4− rejects 0+, 1+.
4803.6 *4*	(1−,2,3,4+)		M T	Jπ: 3647.2γ to 2+; primary γ from 3−,4− rejects 0+, 1+.
4824.4 *6*	(1,2,3)		A O	Jπ: β-decay from 2− parent, log *ft*=6.9 *+3−2*.
4848.39 *20*	1&	17@ fs *+5−3*	P	
4866.09 *8*	1&	4.3@ fs *+14−9*	A P	
4884.02 *8*	(1,2,3)		A j t	XREF: j(4898)t(4889). Jπ: β-decay from 2− parent, log *ft*=5.86 *8*.
4892.6? *8*			A	XREF: A(?).
4904.58 *35*	3−		A j M Q t X	XREF: Others: AB, AF XREF: A(?)j(4898)Q(4900)t(4889)AB(4905)AF(4912). Jπ: L(α,α′)=3 from 0+; L(t,α)=2 from 7/2−. But 2+ from (^{16}O,^{16}O′) is in disagreement.
4914 *10*	2+,3+,4+,5+		j O	XREF: j(4898). Jπ: L(d,p)=1 from 7/2−.
4930.74d *16*	(6−)		F	Jπ: 1016.9γ D, ΔJ=1 to 5− and member of a 4− band in (^{18}O,2p2nγ).
4992 *10*	2+,3+,4+,5+		J O	XREF: Others: AF XREF: J(4991). E(level): from (d,p). Other: 4991 *15* from (t,p). Jπ: L(d,p)=1 from 7/2−.
5005.69 *22*	4+		j M O T X	XREF: Others: AB XREF: j(5015)O(5016)T(5031)AB(5006?). Jπ: L(α,α′)=4 from 0+.
5025.73 *21*	3−		A j R	XREF: Others: AF XREF: j(5015). Jπ: L(π,π′)=3 from 0+.
5087.62c *8*	8+	0.53 ps *14*	EFG	Jπ: 1802.59γ E2, ΔJ=2 6+ and member of g.s. band in (^{18}O,2p2nγ). $T_{1/2}$: from DSAM in (^{14}C,α2nγ).
5096.87 *34*	3−,4−		M T	XREF: Others: AE, AF XREF: AE(5070). Jπ: L(t,α)=0 from 7/2−.
5130.22 *21*	(2,3)+		A M O T	XREF: Others: AF XREF: O(5143)AF(5120?). Jπ: L(d,p)=1 from 7/2−; β-decay from 2− parent, log *ft*=6.7 *+4−2*.
5161.8 *5*	1&	2.6@ fs *3*	A OP	XREF: O(5172).
5201.13 *30*	(1,2,3)−		A j	XREF: j(5222). Jπ: allowed β-decay from 2− parent, log *ft*=5.9 *+4−2*.
5210.0 *5*	1+&	2.0 fs *+4−3*	k P T	XREF: k(5210). $T_{1/2}$: deduced from Γ=0.228 eV *40* in (γ,γ′).

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
				Jπ: parity from 4053γ M1+E2 to 2^+. L(α,^{2}He)=4+5 from 0^+ for a 5210 group is inconsistent.
5222 *5*	(3^-)		Jk T X	XREF: Others: AF XREF: k(5210)af(5235). E(level): from (α,α′). Jπ: L(α,α′)=(3) from 0^+. L(α,^{2}He)=4+5 for a 5210 group.
5230.33 *20*	$2^+,3^+,4^+,5^+$	<4.2 ns	Jk M O T	XREF: Others: AF XREF: J(5245)k(5210)O(5243)T(5235)af(5235) . Jπ: L(d,p)=1 from $7/2^-$ for a group at 5343 *10*. Other: 3^- for a group at 5235 *5* in (p,p′) is inconsistent.
5245.19[e] *12*	7^-		F	Jπ: 1331.3γ ΔJ=2 to 5^-, 1960.2γ ΔJ=1 to 6^+; band assignment.
5289.25 *32*			M o T	XREF: o(5296). Jπ: L(d,p)=1 for a group at 5296 *10*, probably a doublet of 5289+5301.
5300.5 *4*			M o T	XREF: Others: AF XREF: o(5296)AF(5306). Jπ: see comment for 5289 level.
5325.0 *6*	(1,2,3)		A j	XREF: j(5333). Jπ: β-decay from 2^- parent, log *ft*=6.5 *+4−2*.
5342.2 *5*	$(2)^+$		j M O X	XREF: Others: AF XREF: j(5333)O(5351). Jπ: L(α,α′)=(2) from 0^+; L(d,p)=1 from $7/2^-$.
5367.5 *7*	(1,2,3)		A j	XREF: j(5361). Jπ: β-decay from 2^- parent, log *ft*=5.9 *+8−3*.
5375.0 *5*	$(2,3,4)^+$		j M O	XREF: j(5361)O(5385). Jπ: L(d,p)=1 from $7/2^-$; 4217.9γ to 2^+.
5406 *5*	$3^-,4^-$		O X	XREF: Others: AE, AF XREF: AE(5430). E(level): weighted average of 5405 *10* from (d,p), 5407 *5* from (α,α′), and 5404 *12* from (t,α). Jπ: L(t,α)=L(d,^{3}He)=0 from $7/2^-$.
5458.9 *4*	$(2,3,4)^+$		M O	Jπ: L(d,p)=1 from $7/2^-$; 4301.7γ to 2^+.
5512.3 *10*			A X	XREF: Others: AF XREF: A(5512?)AF(5518).
5548.68 *22*	$(2,3,4)^+$		M O	Jπ: L(d,p)=1 from $7/2^-$; 4391.5γ to 2^+.
5561.0 *5*	3^-		A	XREF: Others: AF XREF: AF(5579). Jπ: L(t,α)=0 from $7/2^-$; allowed β feeding from spin=2 parent; 4403.6γ to 2^+.
5611.56 *28*	1&	1.4@ fs *+7−4*	P	
5646.79 *14*	$8^{(+)}$		F	Jπ: ΔJ=0 (M1) to 8^+ in (^{18}O,2p2nγ).
5656 *5*	$(1 \text{ to } 6)^-$		J O X	XREF: Others: AF XREF: J(5646)O(5666). E(level): weighted average of 5646 *20* in (t,p), 5666 *10* in (d,p), 5654 *5* from (α,α′), and 5660 *12* from (t,α). Jπ: L(t,α)=2 from $7/2^-$.
5733.30 *22*	$(4,5)^+$	<3.5 ns	J M O X	XREF: Others: AF Jπ: L(d,p)=1 from $7/2^-$; 1640.7γ to (6^+).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
5775.76 *22*	$(2,3,4)^+$		M O	Jπ: L(d,p)=1 and γ to 2^+.
5800.61 *20*	1&	11@ fs *+5–3*	P	XREF: Others: AF XREF: af(5810).
5806.31 *10*	1^-&	2.3@ fs *3*	P	XREF: Others: AF XREF: af(5810). Jπ: from γ(pol) in (γ,γ′) (2016De05).
5832 *10*			O X	XREF: X(5830).
5864 *20*	0^+		H JK	XREF: H(5850)J(5864)K(5860). E(level): from (t,p). Jπ: L(t,p)=L(^{6}Li,d)=L(α,^{2}He)=0 from 0^+.
5866.82 *30*	$(4^+,5^+)$		M O	XREF: O(5873?). Jπ: L(d,p)=(1) from $7/2^-$; 1773.3γ to 6^+.
5875.82 *20*	1^-&	4.2@ fs *+8–5*	P X	XREF: Others: AF XREF: X(5880)AF(5891). Jπ: from γ(pol) in (γ,γ′) (2016De05).
5911.13 *20*	1&	1.9@ fs *+6–4*	P X	XREF: X(5940?).
5971.30d *14*	$8^{(-)}$		F	Jπ: 1040.5γ Q, ΔJ=2 to 6^-, 726.1γ (M1), ΔJ=1 to 7^-.
5975 *10*			O X	XREF: X(5970).
6014 *20*			J X	XREF: X(6020).
6040.0 *5*	$2^+,3^+,4^+,5^+$		M O	XREF: O(6050). Jπ: L(d,p)=1 from $7/2^-$.
6082.9 *4*	1^+&	2.1@ fs *+4–3*	P	
6136.59 *26*	1^-&	1.27@ fs *+20–15*	P	XREF: Others: AE XREF: AE(6100).
6146.14 *31*	$(4,5)^+$		M O	Jπ: L(d,p)=1 from $7/2^-$; 2053.9γ to (6^+).
6211.4 *5*			K M	XREF: K(6210). Jπ: L(α,^{2}He)=2 for a 6210 group suggests π=+.
6245.48 *30*	1&	9@ fs *+3–2*	k P	XREF: k(6210).
6422.12 *10*	1^-&	0.21@ fs *2*	J P	XREF: J(6438).
6446.5 *7*	1^+&	5.9@ fs *+16–11*	P	
6507.1 *5*	1&	3.3@ fs *+9–6*	P	
6578 *20*			J	
6657.65e *17*	$9^{(-)}$		F	Jπ: 1412.4γ (E2), ΔJ=2 to 7^-, 1570γ (E1), ΔJ=1 to 8^+.
6672.92 *31*			M	
6675.44 *20*	1&	4.5@ fs *+9–6*	P	
6744 *20*			J	
6778 *20*			J	
6913 *20*			J	
6960.7 *6*	1&	5.6@ fs *+13–9*	P	
6972.14 *19*	1&	0.47@ fs *+14–9*	j P	XREF: j(6996).
6996 *20*			J	
7065.9 *9*	1&	2.7@ fs *+6–4*	P	
7092.76 *15*	(9^-)		F	Jπ: 2005.1γ (E1), ΔJ=1 to 8^+, (E1) to 8^+.
7226.04 *30*	1&	2.8@ fs *+6–4*	P	
7275.2 *9*	1&	1.9@ fs *+4–3*	P	
7403.0 *8*	1&	3.7@ fs *+9–6*	P	
7470.92 *20*	(10^+)		F	Jπ: 1824.1γ Q, ΔJ=2 to (8^+).
7556.58 *22*	(9)		F	Jπ: 2468.9γ D, ΔJ=(1) to 8^+.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
7572.0 *5*	1(+)&	2.6@ fs *+8–5*	P	
7578.90 *30*	1−&	0.51@ fs *+7–6*	P	
7662.1 *6*	1−&	4.7@ fs *+21–11*	P	
7783.3 *10*	1−&	4.2@ fs *+19–11*	P	
7808.9 *16*	1−&	8@ fs *+4–2*	P	
7828.9 *12*	1&	6@ fs *+3–2*	P	
7834.8 *8*	1−&	3.0@ fs *+9–6*	P	
7844 *20*			J	
7879.97d *19*	(10−)		F	Jπ: 1908.6γ Q, ΔJ=2 to 8−, 787.2γ (M1), ΔJ=1 to (9−).
7953.1 *5*	1&	1.7@ fs *+7–4*	P	
8050			K	Jπ: L(α,^{2}He)=3 from 0+ suggests π=−.
8070.2 *7*	1&	2.2@ fs *+5–3*	P	
8086.0 *7*	1&	2.1@ fs *+5–3*	P	
8286.28e *26*	(11−)		F	Jπ: 1628.6γ (E2), ΔJ=2 to 9−; band assignment.
8290			K	Jπ: L(α,^{2}He)=5 from 0+ suggests π=−.
8321.5 *16*	1&	9.5@ fs *+7–3*	P	
8395.3 *4*	1&	1.6@ fs *+5–3*	P	
8405.4 *17*	1&	0.42@ fs *+7–5*	P	
8556.7 *8*	1−&	2.4@ fs *+16–7*	P	
8615.2 *12*	1−&	2.3@ fs *+10–5*	P	
8801.9 *29*	1−&	11@ fs *+13–4*	P	
8828.0 *11*	1−&	0.8@ fs *+3–2*	P	
8851.5 *7*	1−&	0.70@ fs *+17–12*	P	
8860			K	Jπ: L(α,^{2}He)=(5,6,7) from 0+.
8908.8 *7*	1−&	0.33@ fs *+7–5*	P	
9024.1 *20*	1−&		P	
9148.4 *24*	1−&		P	
9273.6 *8*	1−&	1.1@ fs *+3–2*	P	
9317.2 *10*	1−&		P	
9460			K	Jπ: L(α,^{2}He)=3 from 0+ suggests π=−.
9664.9 *7*	1−&		P	
9750			K	Jπ: L(α,^{2}He)=(7,8) from 0+.
9788.6 *6*			F	Jπ: 2317.6γ to (10+).
9814.1 *11*	1−&		P	
9859.5d *4*	(12−)		F	Jπ: 1979.5γ (E2), ΔJ=2 to (10−); band assignment.
9898.2 *10*	1−&		P	
10567.8e *5*	(13−)		F	Jπ: 2281.5γ Q, ΔJ=2 to (11−); band assignment.
(11131.60 *12*)	3−,4−		M	Jπ: s-wave capture in 7/2− g.s. of ^{43}Ca. E(level): S(n)=11131.16 *23* (2021Wa16).
11132.73 *30*	4−a	1.13 eV	N	
11134.44 *23*	+a		N	
11134.52 *23*	(4)−a	0.67 eV	N	
11135.49 *23*	4−a	0.522 eV *7*	N	

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
11135.72 *23*	+a		N	
11136.33 *23*	3−a	1.23 eV *10*	N	
11136.35 *23*	4−a		N	
11138.07 *23*	3−a	0.69 eV *7*	N	
11139.93 *23*	4−a	0.68 eV *7*	N	
11141.00 *23*	+a		N	
11141.22 *23*	+a		N	
11141.52 *23*	(4)−a	0.76 eV *10*	N	
11143.08 *23*			N	
11143.31 *23*			N	
11143.77 *23*	+a		N	
11144.39 *23*			N	
11144.9 *5*	4−a	1.0 eV *1*	N	
11145.29 *23*	(3)−a	0.8 eV *9*	N	
11145.65 *23*	+a		N	
11146.04 *23*	+a		N	
11146.19 *23*	+a		N	
11147.53 *23*	3−,4−a		N	
11149.99 *24*	4−a	0.66 eV *7*	N	
11150.62 *23*	+a		N	
11151.10 *23*	(3)−a	0.80 eV *12*	N	
11152.19 *23*	(3)−a	0.79 eV *10*	N	
11152.71 *23*	(3)a	0.5 eV	N	
11153.68 *23*	(4)−a	0.57 eV *9*	N	
11154.10 *23*	+a		N	
11154.90 *23*	(2)+a	0.92 eV *12*	N	
11155.07 *23*	(3)−a	0.81 eV *12*	N	
11155.29 *23*	+a		N	
11155.41 *23*	(2)+a	0.74 eV *11*	N	
11157.59 *23*			N	
11157.71 *23*	(4)−a	0.60 eV *8*	N	
11157.99 *23*	3−,4−a		N	
11158.69 *23*	+a		N	
11158.84 *23*	+a		N	
11160.27 *23*	(4)−a	0.66 eV *8*	N	
11160.40 *23*	(4)−a	0.75 eV *10*	N	
11161.47 *23*	+a		N	
11161.65 *23*	(4)−a	0.66 eV *7*	N	
11161.86 *23*	+a		N	
11162.06 *23*	(4)−a	0.75 eV *9*	N	
11162.89 *23*			N	
11164.00 *23*			N	
11165.39 *23*			N	
11165.91 *23*			N	
11166.61 *23*			N	
11166.74 *23*			N	
11167.34 *23*			N	
11167.58 *23*	(4)−a	1.4 eV *2*	N	
11170.05 *23*			N	
11850 *10*			Q	T=3
12188.1 *10*			F	Additional information 2.
16.5×10^{3}b *15*		4.9b MeV *+21−24*	X	

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Adopted Levels, Gammas (continued)

^{44}Ca Levels (continued)

E(level)[†]	$T_{1/2}$[#]	XREF
17.13×10^3[b] *11*	9.40[b] MeV *14*	X
19.5×10^3[b] *4*	5.8[b] MeV *+9−7*	X
34.9×10^3[b] *15*	16.3[b] MeV *23*	X

† From a least-squares fit to γ-ray energies for levels populated in γ-ray studies, and from different reactions as noted for others, unless otherwise noted.

‡ When assigning J^π to a level based on γ transitions from this level to a level of known J^π, evaluators use the following rules: if Eγ<4 MeV, transitions are only considered to be E1, M1 or E2; if Eγ>4 MeV, M2 and E3 are considered to be possible.

From DSAM in (α,pγ), unless otherwise stated. Values quoted in nanoseconds are from $\gamma\gamma$(t) in (n,γ).

@ Deduced by the evaluators from Γ_γ in (γ,γ'). Actual $T_{1/2}$ could be smaller for levels from which only the g.s. transitions are reported, with the possibility that competing transitions to the low-lying 2^+ and 0^+ excited states in ^{44}Ca might have missed observation, making Γ_γ underestimated, thus $T_{1/2}$ overestimated.

& From ΔJ=1 excitation and γ(linear polarization) in (γ,γ') and (polarized γ,γ').

a From analysis of neutron resonance.

b From (α,α') for giant resonance.

c Band(A): Yrast g.s. band.

d Band(B): Band based on 4^-, α=0.

e Band(b): Band based on 5^-, α=1.

Adopted Levels, Gammas (continued)

$\gamma(^{44}Ca)$

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	δ	$I_{(\gamma+ce)}$	Comments
1157.0208	2^+	1157.004 *3*	100	0.0	0^+	E2			B(E2)(W.u.)=10.06 *+42−40* E_γ: weighted average of 1157.002 *3* from ^{44}K β^- decay, 1157.022 *15* from ^{44}Sc ε decay (4.0420 h), 1157.002 *15* from ^{44}Sc ε decay (58.61 h), 1157 *1* from (^{16}O,2pγ), 1157.0 *2* from (^{18}O,2p2nγ), 1157.031 *15* from (^{14}C,α2nγ), 1156.89 *15* from (n,γ) E=thermal, 1158 *1* from (p,p′γ), and 1155.9 *5* from (μ^-,nγ). Mult.: ΔJ=2, Q γ from DCO in (^{18}O,2p2nγ); M2 rejected by RUL.
1883.516	0^+	726.490 *16*	100	1157.0208	2^+	E2			B(E2)(W.u.)=22 *+9−5* Mult.: Q from p$\gamma(\theta)$ in (p,p′γ); M2 ruled out by RUL.
		(1883.47)		0.0	0^+	E0		≈0.012	$I_{(\gamma+ce)}$: branching deduced by the evaluators from q^2_K(E0/E2)=I_K(E0)/I_K(E2)=0.54 *9* and assuming 80% K-shell conversion of E0 transition. q^2_K(E0/E2)=0.54 *9*, X(E0/E2)=0.23 *4*, ρ^2(E0)=0.14 *5* (2005Ki02 evaluation). Γ(pair formation)/Γ=8.8×10^{-4} *14* from (p,p′) (1976Ul01); Γ(pair formation)=2.1×10^{-8} eV *3* from (e,e′) (1978Gr02).
2283.119	4^+	1126.078 *10*	100	1157.0208	2^+	E2			B(E2)(W.u.)=18 *+10−5* E_γ: weighted average of 1126.076 *10* from ^{44}K β^- decay, 1126.084 *20* from ^{44}Sc ε decay (58.61 h), and 1126.092 *40* from (^{14}C,α2nγ). Others: 1126 *1* from (^{16}O,2pγ), 1126.1 *2* from (^{18}O,2p2nγ), 1126.03 *15* from (n,γ) E=thermal, 1127 *1* from (p,p′γ), and 1124.1 *7* from (μ^-,nγ). Mult.,δ: δ(O/Q)=−0.05 *+4−3* from p$\gamma(\theta)$ in (p,p′γ); M2, M3 ruled out by RUL.
2656.509	2^+	1499.449 *15*	100.0 *17*	1157.0208	2^+	M1+E2	−0.123 *17*		B(M1)(W.u.)=0.191 *+22−17*; B(E2)(W.u.)=3.6 *+12−9* E_γ: from ^{44}Sc ε decay (4.0420 h). Others: 1499.45 *4* from ^{44}K β^- decay, 1499.4 *3* from (^{18}O,2p2nγ), 1499.30 *18* from (n,γ) E=thermal, 1501 *2* from (p,p′γ), and 1510 *10* from (μ^-,nγ). I_γ: from ^{44}Sc ε decay (4.0420 h). Others: 100.0 *37* from ^{44}K β^- decay and 100.0 *25* from (p,p′γ). Mult.,δ: δ(Q/D) is weighted average of −0.15 *+4−9* (1970La09) and −0.14 *7* (1966Ma31) in (p,p′γ), −0.137 *17* (1968Wa21), and −0.07 *3* (1971Ok03) in ^{44}Sc ε decay (4.0420 h); E1+M2 ruled out by RUL.
		2656.44 *3*	12.39 *33*	0.0	0^+	E2			B(E2)(W.u.)=1.70 *+20−16* E_γ: weighted average of 2656.41 *3* from ^{44}K β^- decay, 2656.48 *4*

$^{44}_{20}Ca_{24}$-12

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	δ	α @	Comments
									from ^{44}Sc ε decay (4.0420 h), 2656.2 *5* from (n,γ) E=thermal, and 2656 *3* from (p,p′γ).
									I_γ: weighted average of 12.52 *59* from ^{44}K β^- decay, 12.31 *33* from ^{44}Sc ε decay (4.0420 h), and 17.0 *38* from (p,p′γ).
3044.292	4+	761.12 *4*	100 *5*	2283.119	4+	M1+E2	−0.18 *8*		Mult.: Q from pγ(θ) in (p,p′γ); M2 ruled out by RUL. B(M1)(W.u.)=0.0055 *+15−13*; B(E2)(W.u.)=0.9 *+10−6*
									E_γ: weighted average of 761.10 *3* from ^{44}K β^- decay, 761.3 *1* from (^{18}O,2p2nγ), and 761.19 *10* from (n,γ) E=thermal. Others: 761.19 *20* from (^{14}C,α2nγ) and 764 *1* from (p,p′γ).
									I_γ: from (^{14}C,α2nγ). Others: 100 *50* from ^{44}K β^- decay, 100.0 *52* from (^{18}O,2p2nγ), and 100.0 *79* from (p,p′γ).
									Mult.,δ: δ(Q/D) from weighted average of −0.18 *8* from (^{14}C,α2nγ) and −0.25 *+9−31* from (p,p′γ); E1+M2 ruled out by RUL.
		1887.34 *20*	92.5 *30*	1157.0208	2+	E2			B(E2)(W.u.)=0.27 *+7−6*
									E_γ: weighted average of 1887.21 *28* from ^{44}K β^- decay, 1887.3 *2* from (^{18}O,2p2nγ), 1887.45 *20* from (^{14}C,α2nγ), and 1887.3 *3* from (n,γ) E=thermal. Other: 1890 *2* from (p,p′γ).
									I_γ: weighted average of 100 *50* from ^{44}K β^- decay, 93.1 *69* from (^{18}O,2p2nγ), 85.4 *42* from (^{14}C,α2nγ), and 95.9 *30* from (p,p′γ).
									Mult.,δ: δ(O/Q)=−0.08 *+3−6* from (p,p′γ); M2,M3 ruled out by RUL.
3285.004	6+	1001.869 *20*	100	2283.119	4+	E2			B(E2)(W.u.)=4.57 *+46−37*
									E_γ: weighted average of 1001.876 *20* from ^{44}Sc ε decay (58.61 h), 1001.9 *1* from (^{18}O,2p2nγ), and 1001.850 *31* from (^{14}C,α2nγ). Others: 1001 *1* from (^{16}O,2pγ) and 1001.85 *15* from (n,γ) E=thermal.
									Mult.: Q, ΔJ=2 from DCO in (^{18}O,2p2nγ); M2 ruled out by RUL.
3301.36	2+	2144.27 *8*	100 *6*	1157.0208	2+	[M1,E2]			E_γ: weighted average of 2144.23 *8* from ^{44}K β^- decay, 2144.33 *10* from ^{44}Sc ε decay (4.0420 h), 2144.5 *5* from (n,γ) E=thermal, and 2144 *2* from (p,p′γ).
									I_γ: others: 100 *19* from ^{44}Sc ε decay (4.0420 h) and 100.0 *90* from (p,p′γ).
									B(M1)(W.u.)=0.044 *+40−16* if M1, B(E2)(W.u.)=27 *+24−10* if E2.
		3301.33 *6*	44 *7*	0.0	0+	E2			B(E2)(W.u.)=1.4 *+12−5*
									E_γ: weighted average of 3301.21 *14* from ^{44}K β^- decay, 3301.35 *6* from ^{44}Sc ε decay (4.0420 h), 3301.5 *6* from (n,γ) E=thermal, and 3304 *4* from (p,p′γ).
									I_γ: weighted average of 42.6 *70* from ^{44}K β^- decay, 38 *11* from ^{44}Sc ε decay (4.0420 h), and 49.3 *75* from (p,p′γ).
									Mult.: Q from pγ(θ) in (p,p′γ); M2 ruled out by RUL.

$^{44}_{20}Ca_{24}$-13

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[@]	Comments
3307.872	3⁻	263.53 *6*	0.49 *13*	3044.292	4⁺	[E1]	1.13×10⁻³ *2*	B(E1)(W.u.)=0.00068 *+49−25*
		651.353 *16*	13.2 *8*	2656.509	2⁺	[E1]		B(E1)(W.u.)=0.0012 *+8−4* E_γ: weighted average of 651.355 *9* from ^{44}K β^- decay, 651.07 *12* from (n,γ) E=thermal, and 652 *1* from (p,p′γ). I_γ: weighted average of 13.30 *51* from ^{44}K β^- decay and 6.8 *41* from (p,p′γ).
		1024.738 *17*	29.4 *5*	2283.119	4⁺	[E1]		B(E1)(W.u.)=0.00069 *+44−20* E_γ: others: 1024.4 *3* from (^{18}O,2p2nγ), 1024.66 *20* from (n,γ) E=thermal, and 1026 *1* from (p,p′γ). I_γ: other: 28.4 *68* from (p,p′γ).
		2150.805 *17*	100.0 *21*	1157.0208	2⁺	[E1]		B(E1)(W.u.)=0.00025 *+16−7* E_γ: weighted average of 2150.786 *17* from ^{44}K β^- decay, 2150.840 *22* from ^{44}Sc ε decay (4.0420 h), 2150.5 *2* from (^{18}O,2p2nγ), 2150.9 *3* from (n,γ) E=thermal, and 2150 *2* from (p,p′γ). I_γ: others: 100.0 *74* from (^{18}O,2p2nγ) and 100.0 *81* from (p,p′γ).
		3307.7 *5*	0.077 *26*	0.0	0⁺	(E3)		B(E3)(W.u.)=9 *+7−4* Mult.: E3 excitation in (e,e′).
3357.29	(2⁺,3,4⁺)	1074.13[‡] *15*	100 *60*	2283.119	4⁺			E_γ: others: 1074.1 *4* from ^{44}K β^- decay and 1074 *1* from (p,p′γ).
		2200.1 *3*	13 *13*	1157.0208	2⁺			
3581.3	0⁺	2426.2 *29*	100	1157.0208	2⁺	(E2)		E_γ: unweighted average of 2423.3 *6* from ^{44}K β^- decay and 2429 *2* from (p,p′γ). Mult.: (Q) from pγ(θ) in (p,p′γ); Δπ=no from level scheme.
3661.527	1⁻	353.67 *25*	0.29 *19*	3307.872	3⁻	[E2]	2.18×10⁻³ *3*	E_γ: from (pol γ,γ′).
		1005.0 *9*	0.48	2656.509	2⁺	[E1]		E_γ: from (pol γ,γ′).
		1777.973 *20*	34.8 *8*	1883.516	0⁺	(E1)		E_γ: from (pol γ,γ′). Other: 1780 *2* from (p,p′γ). Mult.: D from pγ(θ) in (p,p′γ); Δπ=yes from level scheme.
		2504.39 *6*	10.7 *9*	1157.0208	2⁺	[E1]		E_γ: from (pol γ,γ′). Other: 2508 *3* from (p,p′γ).
		3661.363 *11*	100.0 *19*	0.0	0⁺	(E1)	1.55×10⁻³ *2*	E_γ: others: 3661.3 *2* from (pol γ,γ′) and 3659 *4* from (p,p′γ). Mult.: D from pγ(θ) in (p,p′γ); Δπ=yes from level scheme.
3676.092	(2⁺)	368.208 *23*	23.2 *4*	3307.872	3⁻			E_γ: weighted average of 368.207 *14* from ^{44}K β^- decay, 368.8 *3* from (n,γ) E=thermal, and 367 *1* from (p,p′γ).
		374.82 *11*	2.0 *5*	3301.36	2⁺			E_γ: weighted average of 374.85 *10* from ^{44}K β^- decay and 374.4 *4* from (n,γ) E=thermal.
		1017.5 *13*	8.7 *4*	2656.509	2⁺			E_γ: unweighted average of 1019.55 *7* from ^{44}K β^- decay, 1017.8 *7* from (n,γ) E=thermal, and 1015 *1* from (p,p′γ).
		2518.991 *18*	100.0 *18*	1157.0208	2⁺			E_γ: others: 2518.9 *5* from (n,γ) E=thermal and 2520 *3* from (p,p′γ).
		3676.7 *6*	0.15 *7*	0.0	0⁺			
3691.7	1	3691.5 *4*	100	0.0	0⁺			E_γ: from (γ,γ′).
3711.96	4⁻	404.26 *13*	100 *8*	3307.872	3⁻	(M1)		B(M1)(W.u.)>5.2×10⁻⁴ E_γ: weighted average of 403.86 *20* from ^{44}K β^- decay, 404.4 *3* from

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Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	δ	α[@]	Comments
									(^{18}O,2p2nγ), and 404.34 *10* from (n,γ) E=thermal. I_γ: from (^{18}O,2p2nγ). Other: 100 *27* from ^{44}K β^- decay. Mult.: D, ΔJ=1 from DCO in (^{18}O,2p2nγ); Δπ=no from level scheme.
3711.96	4$^-$	1428.67 *25*	44 *4*	2283.119	4$^+$	[E1]			B(E1)(W.u.)>1.2×10^{-7} E_γ: weighted average of 1428.7 *4* from ^{44}K β^- decay, 1428.8 *3* from (^{18}O,2p2nγ), and 1428.56 *25* from (n,γ) E=thermal. I_γ: from (^{18}O,2p2nγ). Other: 36 *18* from ^{44}K β^- decay.
3776.27	2$^-$	1119.7 *4*	7.9 *38*	2656.509	2$^+$	[E1]			B(E1)(W.u.)>2.1×10^{-8} I_γ: weighted average of 8.3 *56* from ^{44}K β^- decay and 7.7 *38* from (p,p′γ).
		2619.16 *12*	100 *4*	1157.0208	2$^+$	(E1+M2)	−0.62 *+7−8*		B(E1)(W.u.)>2.6×10^{-8}; B(M2)(W.u.)>0.0061 E_γ: others: 2619.1 *5* from (n,γ) E=thermal and 2617 *4* from (p,p′γ). I_γ: from (p,p′γ). Other: 100 *20* from ^{44}K β^- decay. Mult.: D+Q from (p,p′γ); Δπ=yes from level scheme.
3913.80	5$^-$	202.1 *2*	4.8	3711.96	4$^-$	[M1,E2]		0.010 *8*	E_γ,I_γ: from (^{18}O,2p2nγ) require a $T_{1/2}$>44 ps. B(M1)(W.u.)<0.041 if M1. B(E2)(W.u.)<2767 upper limit exceeds RUL=100 if E2.
		628.71 *11*	92.7 *32*	3285.004	6$^+$	(E1+M2)	−0.30 *14*		B(E1)(W.u.)<5.3×10^{-4} B(M2)(W.u.)<1013 upper limit exceeds RUL=3 *14*, RUL=3 would require a $T_{1/2}$>0.11 ns. E_γ: unweighted average of 628.9 *1* from (^{18}O,2p2nγ), 628.53 *9* from (^{14}C,α2nγ), and 628.69 *10* from (n,γ) E=thermal. I_γ: weighted average of 92.1 *32* from (^{18}O,2p2nγ) and 100 *11* from (^{14}C,α2nγ). Mult.,δ: D+Q from γ(θ) in (^{14}C,α2nγ); Δπ=yes from level scheme. ΔJ=1 from DCO in (^{18}O,2p2nγ).
		869.47 *15*	100 *5*	3044.292	4$^+$	(E1)			B(E1)(W.u.)<2.2×10^{-4} E_γ: weighted average of 869.5 *2* from (^{18}O,2p2nγ) and 869.45 *15* from (n,γ) E=thermal. I_γ: from (^{18}O,2p2nγ). Mult.: D, ΔJ=1 from DCO in (^{18}O,2p2nγ); Δπ=yes from level scheme.
3922.71	5$^-$	637.68 *12*	100[‡]	3285.004	6$^+$	[E1]			B(E1)(W.u.)>1.5×10^{-6} E_γ: weighted average of 637.8 *2* from (^{18}O,2p2nγ) and 637.63 *12* from (n,γ) E=thermal.
		878.25 *20*	91[‡]	3044.292	4$^+$	[E1]			B(E1)(W.u.)>4.8×10^{-7} E_γ: weighted average of 878.4 *2* from (^{18}O,2p2nγ) and 878.10 *20* from (n,γ) E=thermal.

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Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	Comments
3922.71	5^-	1640.7[&‡] *5*	<46[&‡]	2283.119	4^+	[E1]	
4011.4		299.5[‡] *4*	100	3711.96	4^-		
4092.04	(6^+)	806.95[‡] *15*	100 *11*	3285.004	6^+	(E2)	E_γ: other: 807.0 *3* from (^{18}O,2p2nγ). I_γ: from (^{18}O,2p2nγ). Mult.: from DCO in (^{18}O,2p2nγ).
		1809.0 *4*	53 *7*	2283.119	4^+	(E2)	E_γ: weighted average of 1809.1 *4* from (^{18}O,2p2nγ) and 1808.9 *5* from (n,γ) E=thermal. I_γ: from (^{18}O,2p2nγ). Other: 48 from (n,γ) E=thermal. Mult.: from DCO in (^{18}O,2p2nγ).
4093.7	$(2^+,3,4^+)$	1810.4 *7*	100 *67*	2283.119	4^+		
		2937.8 *10*	67 *25*	1157.0208	2^+		
4196.10	2^+	3038.7[‡] *4*	30 *7*	1157.0208	2^+	[M1,E2]	E_γ: other: 3040 from (p,p′γ); not seen in (γ,γ′). I_γ: from (p,p′γ). B(M1)(W.u.)=0.0036 *+9−11* if M1, B(E2)(W.u.)=1.09 *+28−31* if E2.
		4196.1 *3*	100 *4*	0.0	0^+	(E2)	B(E2)(W.u.)=0.73 *15* E_γ: from (γ,γ′), also seen in (p,p′γ). but this γ is not seen in (n,γ) E=thermal. It is likely a different level is populated in (n,γ) E=thermal. I_γ: from (p,p′γ). Mult.: Q from pγ(θ) in (p,p′γ); Δπ=no from level scheme.
4260.27	$(2^+,3)$	1976.9 *7*	82 *64*	2283.119	4^+		
		3103.2 *4*	100 *36*	1157.0208	2^+		
4315.22	(1,2,3)	1658.69 *18*	100 *24*	2656.509	2^+		
		3158.07 *20*	70 *11*	1157.0208	2^+		
4358.440	3^-	646.5 *3*	12 *4*	3711.96	4^-		
		682.34 *3*	11 *6*	3676.092	(2^+)		
		696.9[a]	≤0.8	3661.527	1^-		
		1050.60 *10*	79 *12*	3307.872	3^-		E_γ: other: 1050.54 *20* from (n,γ) E=thermal.
		1701.9 *3*	14 *6*	2656.509	2^+		
		3201.26 *12*	100 *8*	1157.0208	2^+		E_γ: weighted average of 3201.27 *7* from ^{44}K β^- decay and 3200.1 *7* from (n,γ) E=thermal.
4399.2	3^-	3242.0 *6*	100	1157.0208	2^+		E_γ: other: 3242.1 *7* from (n,γ) E=thermal.
4409.176	$(1)^-$	733.0 *4*	4.0 *17*	3676.092	(2^+)		
		747.63 *3*	51.4 *29*	3661.527	1^-		
		1101.3 *5*	0.29 *29*	3307.872	3^-		
		1107.98 *10*	16.4 *12*	3301.36	2^+		
		1752.629 *10*	100.0 *14*	2656.509	2^+		
		3252.07 *13*	3.9 *6*	1157.0208	2^+		
		4408.91 *19*	1.31 *22*	0.0	0^+		
4436.7	$(1,2^+)$	3279.0 *7*	100 *67*	1157.0208	2^+		
		4437.0 *7*	40 *27*	0.0	0^+		

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Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Comments
4479.9	2^+	3322.8[‡] *6*	100	1157.0208	2^+	
4552.644	$(3)^-$	876.53 *3*	100 *2*	3676.092	(2^+)	
		891.10 *12*	5.4 *20*	3661.527	1^-	
		1195.4	2.7 *24*	3357.29	$(2^+,3,4^+)$	
		1244.75 *5*	48.0 *17*	3307.872	3^-	
		1896.0 *9*	6.4 *47*	2656.509	2^+	
		2268.5 *10*	1.7 *14*	2283.119	4^+	
		3395.51 *4*	96.3 *27*	1157.0208	2^+	
4561.8?		3404.6[a] *6*	100	1157.0208	2^+	
4564.87	(5^-)	651.07 *12*	<420	3913.80	5^-	E_γ: other: 651.0 *3* from (^{18}O,2p2nγ). I_γ: from (n,γ) E=thermal, where the 651.07γ is a doubly placed with intensity not divided.
		2281.7[‡] *5*	100[‡]	2283.119	4^+	
		4565.1[a] *8*	98	0.0	0^+	Placement of this transition in (n,γ) E=thermal is considered unlikely by evaluators from the implied high mult=E5.
4572.6	(1,2,3)	1916.0 *8*	100 *52*	2656.509	2^+	
		3415.5 *7*	44 *18*	1157.0208	2^+	
4584.08	$(2^+,3,4^+)$	1276.0[‡] *8*	9.2[‡]	3307.872	3^-	
		1539.40[‡] *25*	39[‡]	3044.292	4^+	
		2300.6[‡] *5*	40[‡]	2283.119	4^+	
		3427.5[‡] *4*	100[‡]	1157.0208	2^+	
4649.46	1	4649.2 *1*	100	0.0	0^+	E_γ: from (γ,γ′).
4650.3	2^+	1992.8 *7*	100 *67*	2656.509	2^+	E_γ: weighted average of 1992.4 *5* from ^{44}K β^- decay and 1994.2 *10* from (n,γ) E=thermal.
		4650.1[‡] *9*	12 *7*	0.0	0^+	I_γ: from ^{44}K β^- decay. In (n,γ), Iγ(4651)/Iγ(1993)=1.43.
4690.0	$(1^-,2,3,4^+)$	3532.9[‡] *6*	100	1157.0208	2^+	
4803.6	$(1^-,2,3,4^+)$	3647.2[‡] *6*	100	1157.0208	2^+	
4824.4	(1,2,3)	2167.8 *6*	100	2656.509	2^+	
4848.39	1	4848.1 *2*	100	0.0	0^+	E_γ: from (γ,γ′).
4866.09	1	1285.0[a] *10*	≤10.7	3581.3	0^+	
		2982.44 *15*	79 *11*	1883.516	0^+	E_γ: weighted average of 2982.47 *15* from ^{44}K β^- decay and 2982.3 *3* from (pol γ,γ′). I_γ: other: 79 *27* from (pol γ,γ′).
		3708.90[a] *13*	≤29	1157.0208	2^+	
		4865.81 *15*	100 *4*	0.0	0^+	E_γ: other: 4865.7 *4* from (pol γ,γ′). I_γ: other: 100 *27* from (pol γ,γ′).
4884.02	(1,2,3)	1222.50 *8*	100 *10*	3661.527	1^-	
		1575.9 *3*	36 *11*	3307.872	3^-	
		3726.6 *4*	6.0 *12*	1157.0208	2^+	

$^{44}_{20}Ca_{24}$-17

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	δ	α[@]	Comments
4892.6?		4892.3[a] *8*	100	0.0	0^+				
4904.58	3^-	2248.2[‡] *5*	63[‡]	2656.509	2^+				
		3747.2[‡] *6*	100[‡]	1157.0208	2^+				
4930.74	(6^-)	1016.9 *2*	100 *7*	3913.80	5^-	D			
		1218.8 *3*	48 *7*	3711.96	4^-				
5005.69	4^+	1092.2[‡] *7*	6.7[‡]	3913.80	5^-				
		1648.1[‡] *5*	69[‡]	3357.29	$(2^+,3,4^+)$				
		2722.4[‡] *3*	100[‡]	2283.119	4^+				
		3848.9[‡] *7*	12.2[‡]	1157.0208	2^+				
5025.73	3^-	1363.7 *8*	18 *18*	3661.527	1^-				
		3868.56 *22*	100 *27*	1157.0208	2^+				
		5025.4 *8*	2.7 *18*	0.0	0^+				
5087.62	8^+	1802.59 *8*	100	3285.004	6^+	E2			B(E2)(W.u.)=6.1 *+22−13* E_γ: from (^{14}C,α2nγ). Others: 1802 *1* from (^{16}O,2pγ) and 1802.6 *2* from (^{18}O,2p2nγ). Mult.: Q, ΔJ=2 from DCO in (^{18}O,2p2nγ); M2 ruled out by RUL.
5096.87	$3^-,4^-$	1183.1[‡] *4*	100	3913.80	5^-				
5130.22	$(2,3)^+$	1773.3[‡] *5*	34[‡]	3357.29	$(2^+,3,4^+)$				
		2846.9 *3*	100[‡]	2283.119	4^+				E_γ: weighted average of 2847.6 *7* from ^{44}K β^- decay and 2846.8 *3* from (n,γ) E=thermal.
		3973.1[‡] *4*	83[‡]	1157.0208	2^+				
5161.8	1	4005	1.8 *18*	1157.0208	2^+				
		5161.33 *63*	100 *6*	0.0	0^+				E_γ: unweighted average of 5161.96 *10* from ^{44}K β^- decay and 5160.7 *3* from (pol γ,γ′).
5201.13	$(1,2,3)^-$	1525.0[a]		3676.092	(2^+)				
		1893.2 *4*	100 *47*	3307.872	3^-				
		4044[a]	≤2.6	1157.0208	2^+				
5210.0	1^+	1909	33 *15*	3301.36	2^+	[M1,E2]			E_γ,I_γ: from (γ,γ′). B(M1)(W.u.)=0.19 *8* if M1, B(E2)(W.u.)=1.4×10^2 *6* if E2.
		2553	4 *4*	2656.509	2^+	[M1,E2]			E_γ,I_γ: from (γ,γ′). B(M1)(W.u.)<0.023 if M1, B(E2)(W.u.)<10 if E2.
		3326	80 *2*	1883.516	0^+	M1			B(M1)(W.u.)=0.085 *+16−15* E_γ,I_γ,Mult.: from (γ,γ′).
		4053	65 *2*	1157.0208	2^+	M1+E2	+0.27 *8*	1.07×10^{-3} *2*	B(M1)(W.u.)=0.036 *7*; B(E2)(W.u.)=0.44 *+27−23* E_γ,I_γ,Mult.,δ: from (γ,γ′).

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Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[@]	Comments
5210.0	1^+	5210	100 *1*	0.0	0^+	M1[#]	1.41×10^{-3} *2*	B(M1)(W.u.)=0.028 *5* E_γ,I_γ: from (γ,γ′).
5230.33	2^+,3^+,4^+,5^+	1872.7[&‡] *3*	<74[&‡]	3357.29	(2^+,3,4^+)			
		2186.2[‡] *10*	6.9[‡]	3044.292	4^+			
		2947.4[‡] *3*	100[‡]	2283.119	4^+			
5245.19	7^-	1331.3 *2*	100 *5*	3913.80	5^-	(E2)		E_γ,I_γ: from (^{18}O,2p2nγ). Mult.: ΔJ=2 from DCO in (^{18}O,2p2nγ).
		1960.2 *2*	97 *7*	3285.004	6^+	(E1)		E_γ,I_γ: from (^{18}O,2p2nγ). Mult.: ΔJ=1 from DCO in (^{18}O,2p2nγ).
5289.25		3006.0[‡] *4*	100	2283.119	4^+			
5300.5		1588.7[‡] *4*	100	3711.96	4^-			
5325.0	(1,2,3)	4167.8 *6*	100 *50*	1157.0208	2^+			
5342.2	$(2)^+$	4185.6[‡] *8*	100	1157.0208	2^+			
5367.5	(1,2,3)	2711	1.0×10^2 *10*	2656.509	2^+			
		4210.1 *10*	30 *27*	1157.0208	2^+			
5375.0	$(2,3,4)^+$	4217.9[‡] *8*	100	1157.0208	2^+			
5458.9	$(2,3,4)^+$	3176.2[‡] *7*	100[‡]	2283.119	4^+			
		4301.7[‡] *7*	50[‡]	1157.0208	2^+			
5512.3		4355[a]	100	1157.0208	2^+			
5548.68	$(2,3,4)^+$	1872.7[&‡] *3*	<540[&‡]	3676.092	(2^+)			
		2891.2[‡a] *6*	63[‡]	2656.509	2^+			
		3265.4[‡] *7*	100[‡]	2283.119	4^+			
		4391.5[‡] *7*	72[‡]	1157.0208	2^+			
5561.0	3^-	1884.5 *10*	100 *75*	3676.092	(2^+)			
		4403.6 *6*	15 *10*	1157.0208	2^+			
		5561.3[a] *10*	13 *10*	0.0	0^+			
5611.56	1	4454.1 *8*	100 *21*	1157.0208	2^+			
		5611.2 *3*	47 *21*	0.0	0^+			
5646.79	$8^{(+)}$	559.2 *2*	100 *11*	5087.62	8^+	(M1)		E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=0 from DCO in (^{18}O,2p2nγ).
		1554.7 *3*	70 *7*	4092.04	(6^+)	(E2)		E_γ,I_γ: from (^{18}O,2p2nγ).
		2361.6 *4*	75 *7*	3285.004	6^+	(E2)		E_γ,I_γ: from (^{18}O,2p2nγ).
5733.30	$(4,5)^+$	1640.7[&‡] *5*	<42[&‡]	4092.04	(6^+)			
		2376.1[‡] *5*	16.7[‡]	3357.29	(2^+,3,4^+)			
		2688.7[‡] *5*	21.3[‡]	3044.292	4^+			

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Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	Comments
5733.30	(4,5)$^+$	3450.3‡ *4*	100‡	2283.119	4$^+$		
5775.76	(2,3,4)$^+$	2099.3‡ *5*	49‡	3676.092	(2$^+$)		
		2474.9‡*a* *6*	24.8‡	3301.36	2$^+$		
		2730.7‡ *6*	33‡	3044.292	4$^+$		
		3120.5‡*a* *15*	12.8‡	2656.509	2$^+$		
		3492.9‡ *4*	100‡	2283.119	4$^+$		
		4618.0‡ *8*	37‡	1157.0208	2$^+$		
5800.61	1	5800.2 *2*	100	0.0	0$^+$		
5806.31	1$^-$	5805.9 *1*	100	0.0	0$^+$	E1#	B(E1)(W.u.)=1.2×10^{-3} *2*
5866.82	(4$^+$,5$^+$)	1773.3‡ *5*	100‡	4093.7	(2$^+$,3,4$^+$)		
		2509.2‡ *6*	23.1‡	3357.29	(2$^+$,3,4$^+$)		
		3583.4‡ *6*	100‡	2283.119	4$^+$		
5875.82	1$^-$	5875.4 *2*	100	0.0	0$^+$	E1#	B(E1)(W.u.)=6.4×10^{-4} *10*
5911.13	1	5910.7 *2*	100	0.0	0$^+$		
5971.30	8$^{(-)}$	726.1 *2*	100 *6*	5245.19	7$^-$	(M1)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).
		883.7 *2*	71 *6*	5087.62	8$^+$		E_γ,I_γ: from (^{18}O,2p2nγ).
		1040.5 *3*	42.9 *29*	4930.74	(6$^-$)	Q	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
6040.0	2$^+$,3$^+$,4$^+$,5$^+$	2682.8‡ *6*	100	3357.29	(2$^+$,3,4$^+$)		
6082.9	1$^+$	4199.5 *5*	62 *12*	1883.516	0$^+$	M1#	B(M1)(W.u.)=0.043 *10*
		4925.3 *8*	41 *7*	1157.0208	2$^+$	[M1,E2]	B(M1)(W.u.)=0.018 *4* if M1, B(E2)(W.u.)=2.0 *5* if E2.
		6080.1 *14*	100 *7*	0.0	0$^+$	M1#	B(M1)(W.u.)=0.023 *4*
6136.59	1$^-$	4978.5 *5*	46 *7*	1157.0208	2$^+$	[E1]	B(E1)(W.u.)=0.00109 *19*
		6136.4 *3*	100 *5*	0.0	0$^+$	E1#	B(E1)(W.u.)=0.00127 *18*
6146.14	(4,5)$^+$	2053.9‡ *5*	86‡	4092.04	(6$^+$)		
		2223.3‡ *20*		3922.71	5$^-$		
		3861.7‡ *7*	100‡	2283.119	4$^+$		
6211.4		2297.5‡ *6*	100	3913.80	5$^-$		
6245.48	1	6245.0 *3*	100	0.0	0$^+$		
6422.12	1$^-$	4539.9 *7*	5.2 *7*	1883.516	0$^+$	E1#	B(E1)(W.u.)=0.0013 *2*
		5263.8 *7*	5.5 *7*	1157.0208	2$^+$	E1#	B(E1)(W.u.)=8.8×10^{-4} *14*
		6421.6 *1*	100 *1*	0.0	0$^+$	E1#	B(E1)(W.u.)=0.0088 *+9−8*
6446.5	1$^+$	5288.0 *17*	50 *14*	1157.0208	2$^+$	[M1,E2]	B(M1)(W.u.)=0.0084 *+24−26* if M1, B(E2)(W.u.)=0.84 *+24−26* if E2.
		6446.3 *8*	100 *10*	0.0	0$^+$	M1#	B(M1)(W.u.)=0.0093 *+24−22*

$^{44}_{20}Ca_{24}$-20

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.	Comments
6507.1	1	6506.6 *5*	100	0.0	0^+		
6657.65	$9^{(-)}$	1412.4 *3*	59 *4*	5245.19	7^-	(E2)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
		1570.0 *2*	100 *6*	5087.62	8^+	(E1)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).
6672.92		2088.2[‡] *5*	100[‡]	4584.08	$(2^+,3,4^+)$		
		2896.7[‡][a] *6*	18.4[‡]	3776.27	2^-		
		3628.9[‡] *7*	34.5[‡]	3044.292	4^+		
6675.44	1	6674.9 *2*	100	0.0	0^+		
6960.7	1	6960.1 *6*	100	0.0	0^+		
6972.14	1	5815.0 *5*	100 *15*	1157.0208	2^+		
		6971.5 *2*	52 *15*	0.0	0^+		
7065.9	1	7065.3 *9*	100	0.0	0^+		
7092.76	(9^-)	435.1 *3*	39	6657.65	$9^{(-)}$		E_γ,I_γ: from (^{18}O,2p2nγ).
		1121.5 *4*	78	5971.30	$8^{(-)}$		E_γ,I_γ: from (^{18}O,2p2nγ).
		1445.9 *3*	100 *11*	5646.79	$8^{(+)}$	D	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).
		2005.1 *2*	67 *6*	5087.62	8^+	(E1)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).
7226.04	1	7225.4 *3*	100	0.0	0^+		
7275.2	1	7274.5 *9*	100	0.0	0^+		
7403.0	1	7402.3 *8*	100	0.0	0^+		
7470.92	(10^+)	1824.1 *2*	100 *8*	5646.79	$8^{(+)}$	Q	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
		2383.2 *3*	55 *6*	5087.62	8^+	Q	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
7556.58	(9)	2468.9 *3*	100	5087.62	8^+	(D)	E_γ: from (^{18}O,2p2nγ). ΔJ=(1) from DCO in (^{18}O,2p2nγ).
7572.0	$1^{(+)}$	7571.3 *5*	100	0.0	0^+	(M1)[#]	B(M1)(W.u.)=0.020 *5*
7578.90	1^-	7578.2 *3*	100	0.0	0^+	E1[#]	B(E1)(W.u.)=0.0025 *3*
7662.1	1^-	7661.4 *6*	100	0.0	0^+	E1[#]	B(E1)(W.u.)=2.6×10^{-4} *8*
7783.3	1^-	7782.6 *10*	100	0.0	0^+	E1[#]	B(E1)(W.u.)=2.7×10^{-4} *+10−8*
7808.9	1^-	7808.2 *16*	100	0.0	0^+	E1[#]	B(E1)(W.u.)=1.4×10^{-4} *5*
7828.9	1	7828.1 *12*	100	0.0	0^+		
7834.8	1^-	7834.0 *8*	100	0.0	0^+	E1[#]	B(E1)(W.u.)=3.8×10^{-4} *+10−9*
7879.97	(10^-)	323.4 *2*	33.3	7556.58	(9)	D	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).

$^{44}_{20}Ca_{24}$-21

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	Comments
7879.97	(10$^-$)	787.2 *2*	100 *8*	7092.76	(9$^-$)	(M1)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=1 from DCO in (^{18}O,2p2nγ).
		1908.6 *3*	74 *8*	5971.30	8$^{(-)}$	Q	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
7953.1	1	5293.8 *14*	100	2656.509	2$^+$		
		7952.6 *5*	100	0.0	0$^+$		
8070.2	1	8069.4 *7*	100	0.0	0$^+$		
8086.0	1	8085.2 *7*	100	0.0	0$^+$		
8286.28	(11$^-$)	1628.6 *2*	100.0 *63*	6657.65	9$^{(-)}$	(E2)	E_γ,I_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
8321.5	1	8320.7 *16*	100	0.0	0$^+$		
8395.3	1	8394.4 *4*	100	0.0	0$^+$		
8405.4	1	8404.5 *17*	100	0.0	0$^+$		
8556.7	1$^-$	8555.8 *8*	100	0.0	0$^+$	E1[#]	B(E1)(W.u.)=3.6×10^{-4} *+15−13*
8615.2	1$^-$	8614.3 *12*	100	0.0	0$^+$	E1[#]	B(E1)(W.u.)=3.7×10^{-4} *11*
8801.9	1$^-$	8800.9 *29*	100	0.0	0$^+$	E1[#]	B(E1)(W.u.)=7.2×10^{-5} *+4−3*
8828.0	1$^-$	6944.6 *18*	100 *14*	1883.516	0$^+$	E1[#]	B(E1)(W.u.)=0.0011 *+4−3*
		8826.6 *14*	89 *23*	0.0	0$^+$	E1[#]	B(E1)(W.u.)=4.7×10^{-4} *+17−15*
8851.5	1$^-$	7692.9 *18*	19 *8*	1157.0208	2$^+$	E1[#]	B(E1)(W.u.)=2.7×10^{-4} *11*
		8850.7 *7*	100 *6*	0.0	0$^+$	E1[#]	B(E1)(W.u.)=9.4×10^{-4} *+21−19*
8908.8	1$^-$	8907.8 *7*	100	0.0	0$^+$	E1[#]	B(E1)(W.u.)=0.0023 *4*
9024.1	1$^-$	9023.1 *20*	100	0.0	0$^+$	E1[#]	
9148.4	1$^-$	9147.4 *24*	100	0.0	0$^+$	E1[#]	
9273.6	1$^-$	9272.5 *8*	100	0.0	0$^+$	E1[#]	B(E1)(W.u.)=6.2×10^{-4} *14*
9317.2	1$^-$	9316.1 *10*	100	0.0	0$^+$	E1[#]	
9664.9	1$^-$	8508.5 *33*	17 *8*	1157.0208	2$^+$		
		9663.7 *7*	100 *6*	0.0	0$^+$	E1[#]	
9788.6		2317.6 *6*	100	7470.92	(10$^+$)		E_γ: from (^{18}O,2p2nγ).
9814.1	1$^-$	9812.9 *11*	100	0.0	0$^+$	E1[#]	
9859.5	(12$^-$)	1979.5 *3*	100	7879.97	(10$^-$)	(E2)	E_γ: from (^{18}O,2p2nγ). ΔJ=2 from DCO in (^{18}O,2p2nγ).
9898.2	1$^-$	9897.0 *10*	100	0.0	0$^+$	E1[#]	
10567.8	(13$^-$)	2281.5 *4*	100	8286.28	(11$^-$)	Q	
(11131.60)	3$^-$,4$^-$	4457.9[‡] *7*	27.3[‡]	6672.92			
		4919.9[‡] *7*	12.9[‡]	6211.4			
		4984.4[‡] *5*	16.1[‡]	6146.14	(4,5)$^+$		

$^{44}_{20}Ca_{24}$-22

Adopted Levels, Gammas (continued)

γ(^{44}Ca) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
(11131.60)	3$^-$,4$^-$	5091.6‡ *8*	5.7‡	6040.0	2$^+$,3$^+$,4$^+$,5$^+$
		5264.4‡ *5*	17.1‡	5866.82	(4$^+$,5$^+$)
		5355.7‡ *5*	41‡	5775.76	(2,3,4)$^+$
		5397.8‡ *5*	54‡	5733.30	(4,5)$^+$
		5582.4‡ *5*	14.2‡	5548.68	(2,3,4)$^+$
		5673.0‡ *7*	7.2‡	5458.9	(2,3,4)$^+$
		5756.3‡ *7*	12.2‡	5375.0	(2,3,4)$^+$
		5789.5‡ *7*	5‡	5342.2	(2)$^+$
		5831.4‡ *7*	14.4‡	5300.5	
		5841.9‡ *5*	16.8‡	5289.25	
		5900.9‡ *5*	100‡	5230.33	2$^+$,3$^+$,4$^+$,5$^+$
		6001.3‡ *6*	49‡	5130.22	(2,3)$^+$
		6034.4‡ *6*	16.9‡	5096.87	3$^-$,4$^-$
		6125.3‡ *6*	53‡	5005.69	4$^+$
		6226.7‡ *8*	12.1‡	4904.58	3$^-$
		6328.3‡ *6*	8.5‡	4803.6	(1$^-$,2,3,4$^+$)
		6441.1‡ *8*	5.6‡	4690.0	(1$^-$,2,3,4$^+$)
		6480.2‡ *6*	33‡	4650.3	2$^+$
		6546.6‡ *6*	33.9‡	4584.08	(2$^+$,3,4$^+$)
		6566.4‡ *6*	8‡	4564.87	(5$^-$)
		6651.3‡ *8*	6‡	4479.9	2$^+$
		6731.9‡ *10*	2.01‡	4399.2	3$^-$
		6772.3‡ *6*	10.8‡	4358.440	3$^-$
		6935.2‡ *6*	12.6‡	4196.10	2$^+$
		7119.7‡ *10*	1.15‡	4011.4	
		7208.1‡ *6*	22.2‡	3922.71	5$^-$
		7354.2‡ *8*	7‡	3776.27	2$^-$
		7418.8‡ *6*	10.6‡	3711.96	4$^-$
		7454.4‡ *10*	1.15‡	3676.092	(2$^+$)
		7773.4‡ *6*	44‡	3357.29	(2$^+$,3,4$^+$)
		7822.3‡ *10*	2.44‡	3307.872	3$^-$
		7829.3‡ *8*	8.6‡	3301.36	2$^+$

$^{44}_{20}Ca_{24}$-23

Adopted Levels, Gammas (continued)

$\gamma(^{44}Ca)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Comments
(11131.60)	$3^-,4^-$	8086.4‡ *7*	9.6‡	3044.292	4^+	
		8474.3‡ *10*	1‡	2656.509	2^+	
		8848.0‡ *7*	5.3‡	2283.119	4^+	
		9974.3‡ *8*	1.58‡	1157.0208	2^+	
12188.1		2399.5 *7*	100	9788.6		E_γ: from (^{18}O,2p2nγ).

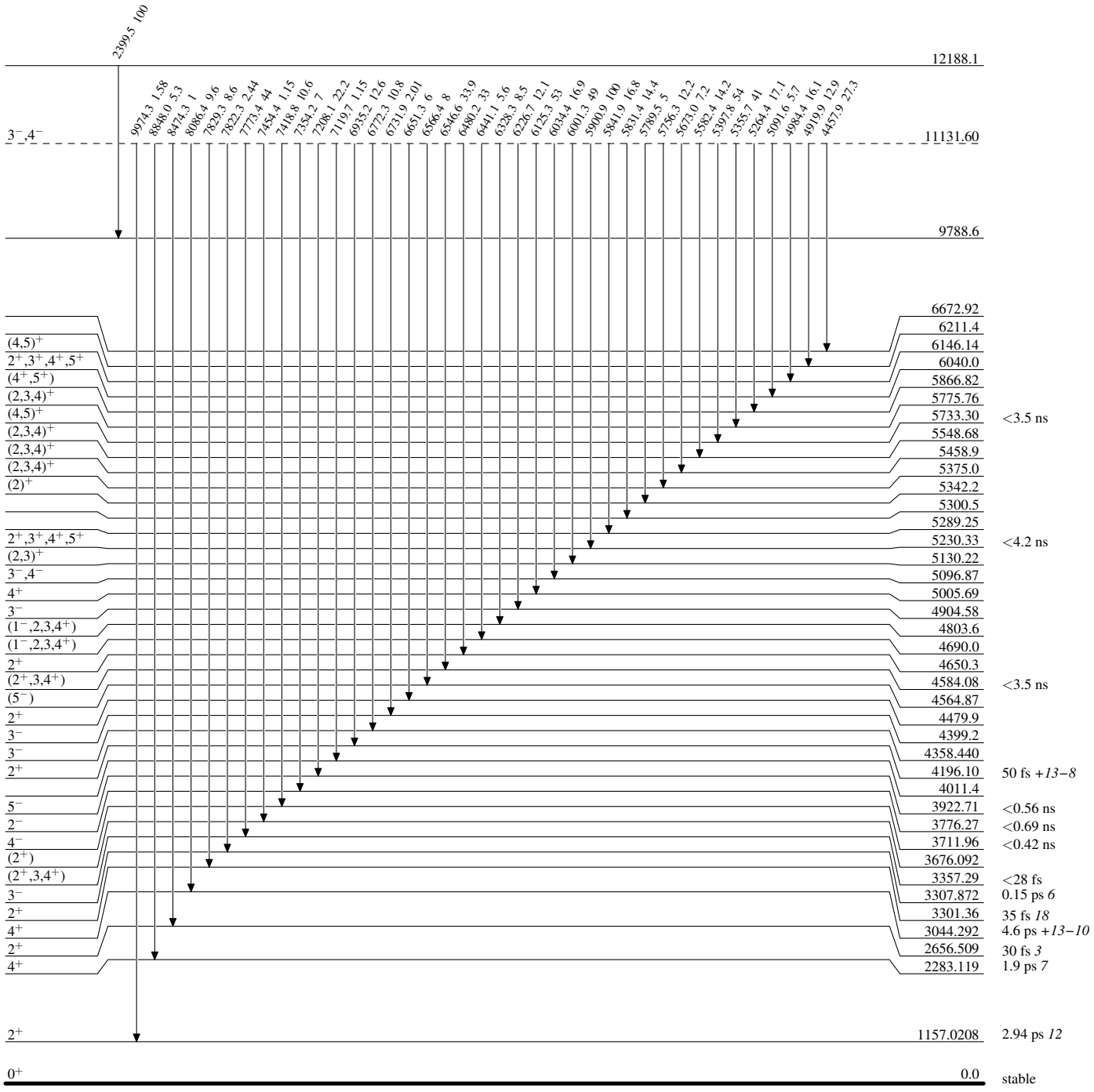
† From ^{44}K β^- decay up to 5561 level, and from (γ,γ'),(pol γ,γ') above that, unless otherwise noted.
‡ From (n,γ) E=thermal.
# From γ(linear polarization) in (polarized γ,γ').
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
& Multiply placed with undivided intensity.
a Placement of transition in the level scheme is uncertain.

$^{44}_{20}Ca_{24}$-24

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

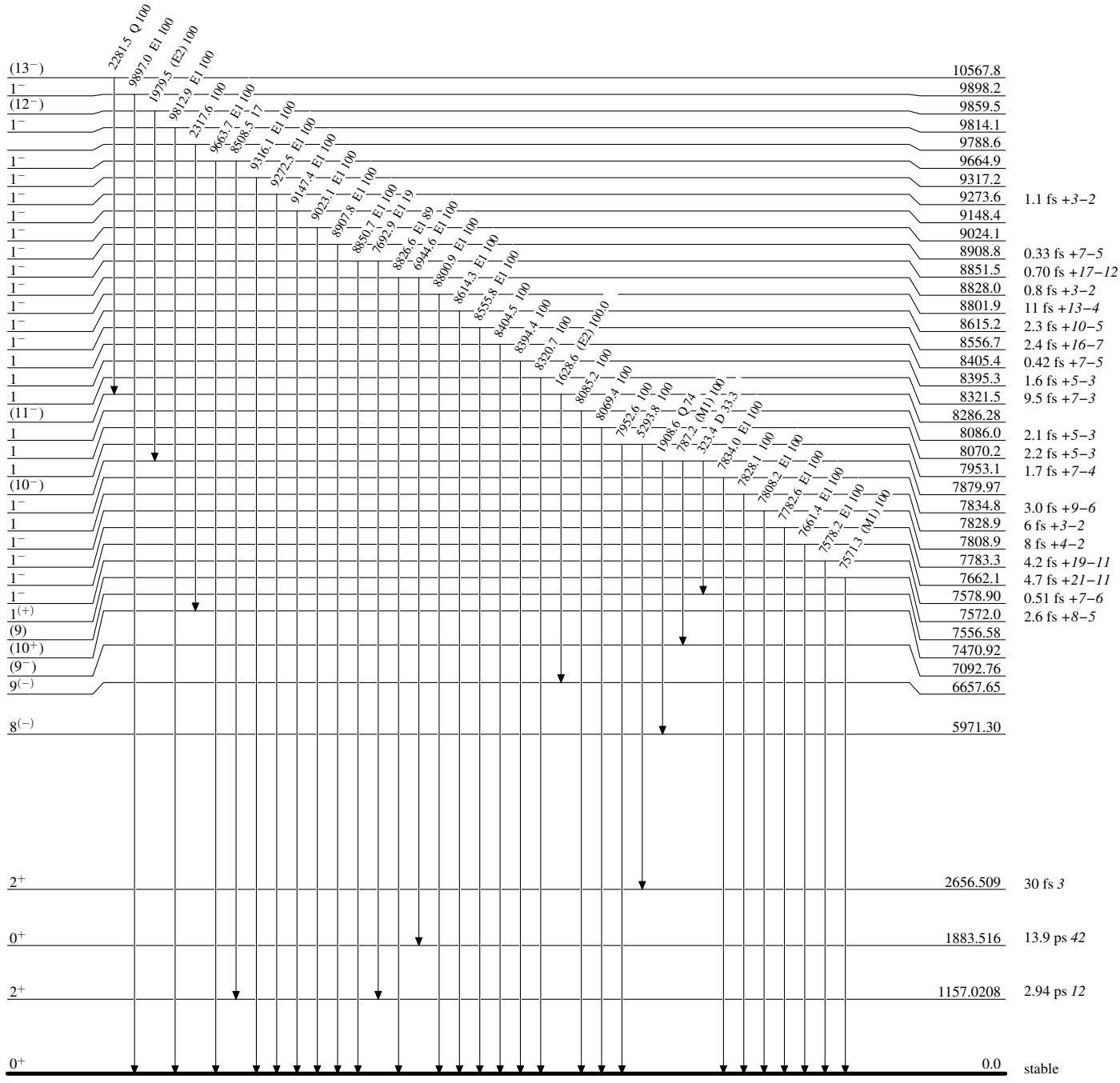


$^{44}_{20}Ca_{24}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{44}_{20}Ca_{24}$

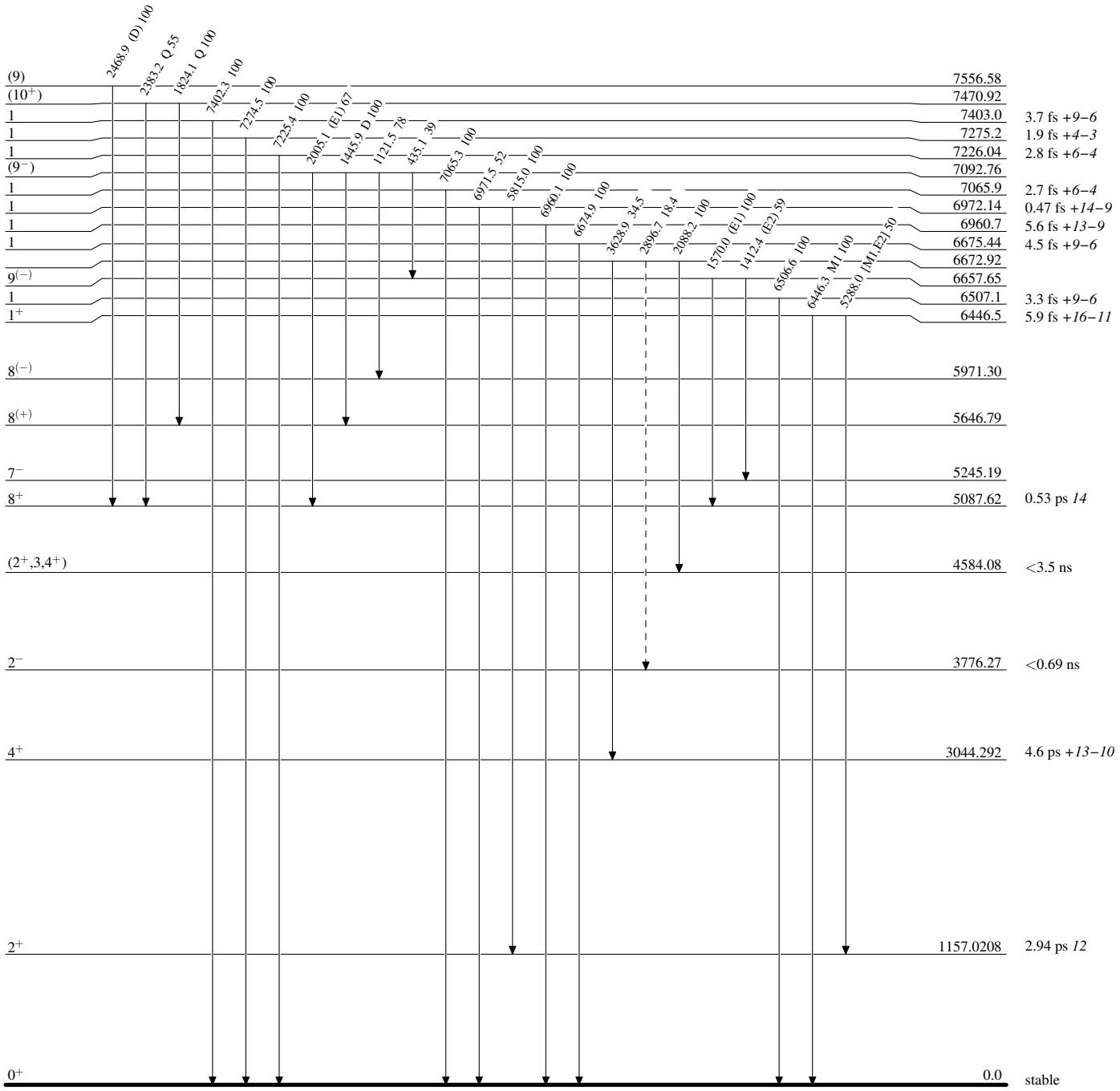
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

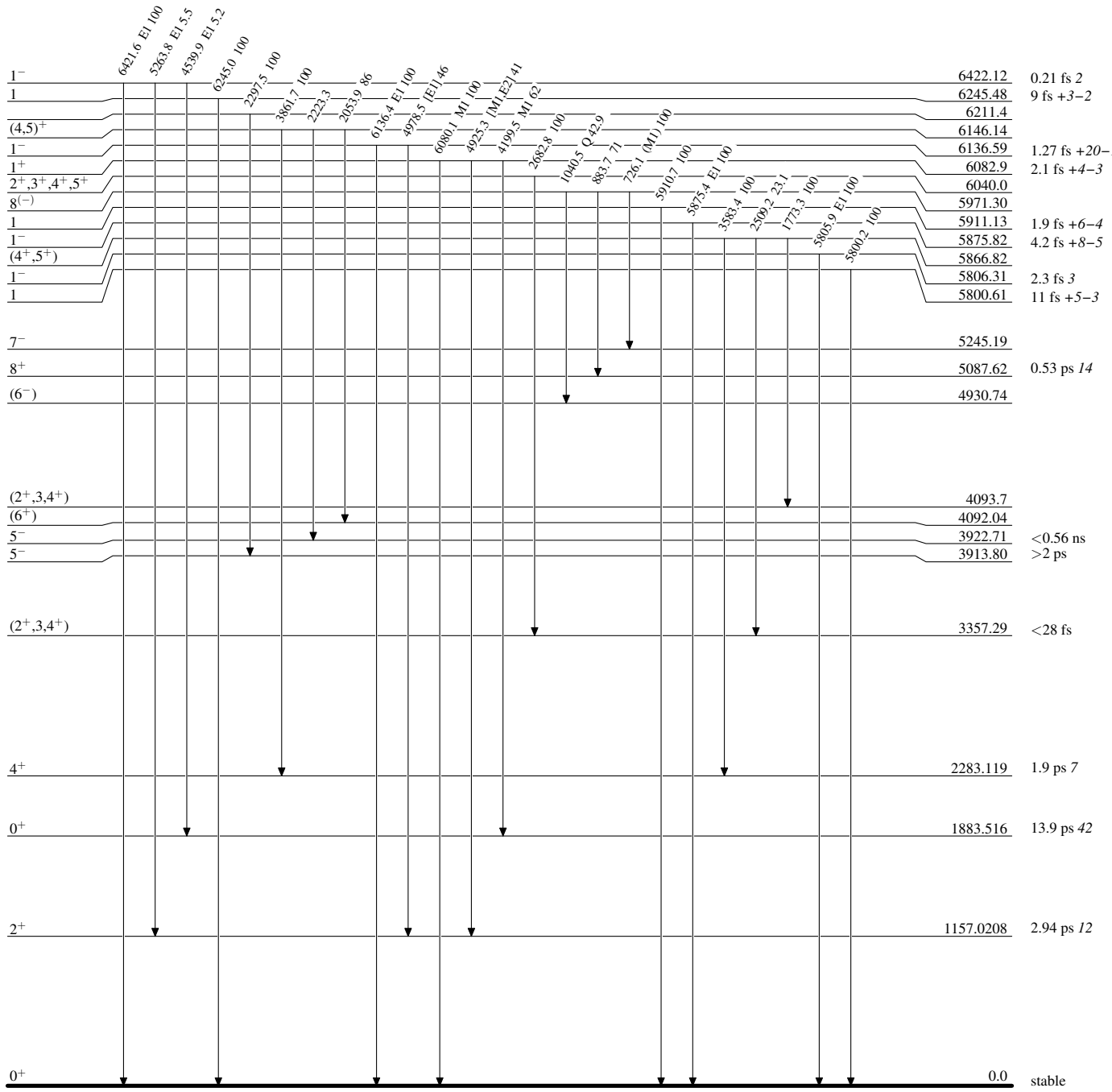


$^{44}_{20}Ca_{24}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{44}_{20}Ca_{24}$

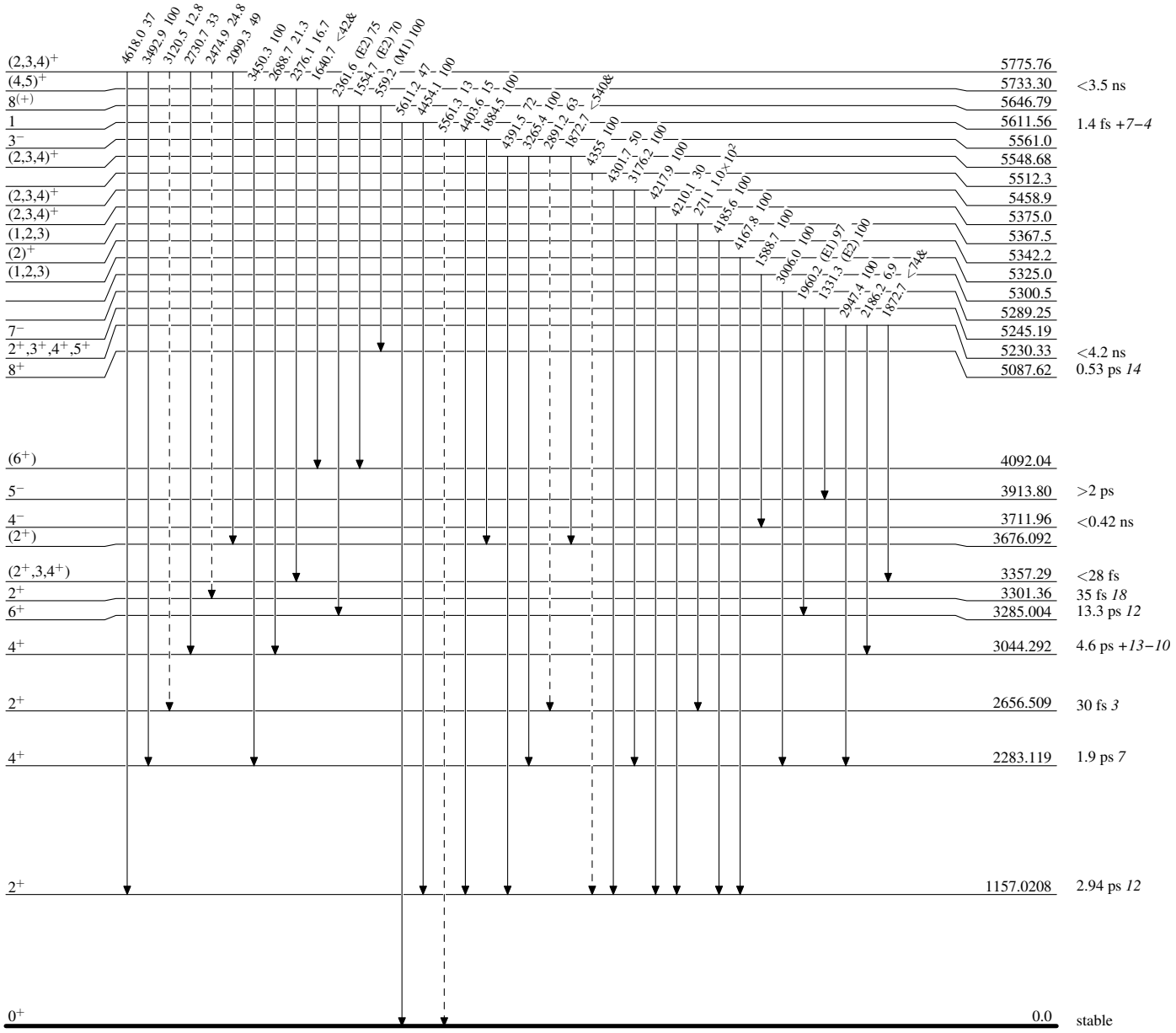
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

– – – – – – ► γ Decay (Uncertain)



$^{44}_{20}Ca_{24}$

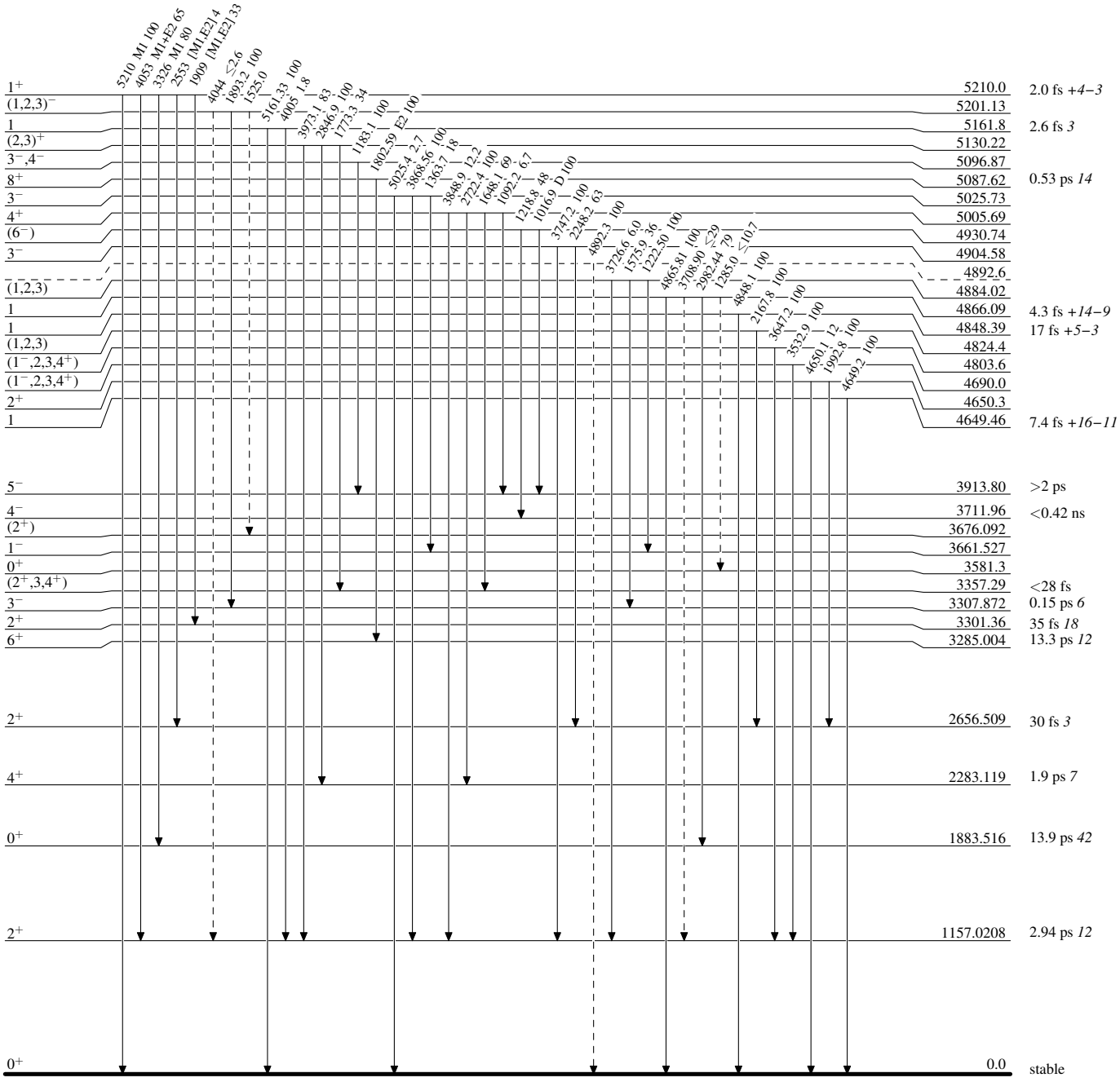
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

– – – – – – ► γ Decay (Uncertain)



$^{44}_{20}Ca_{24}$

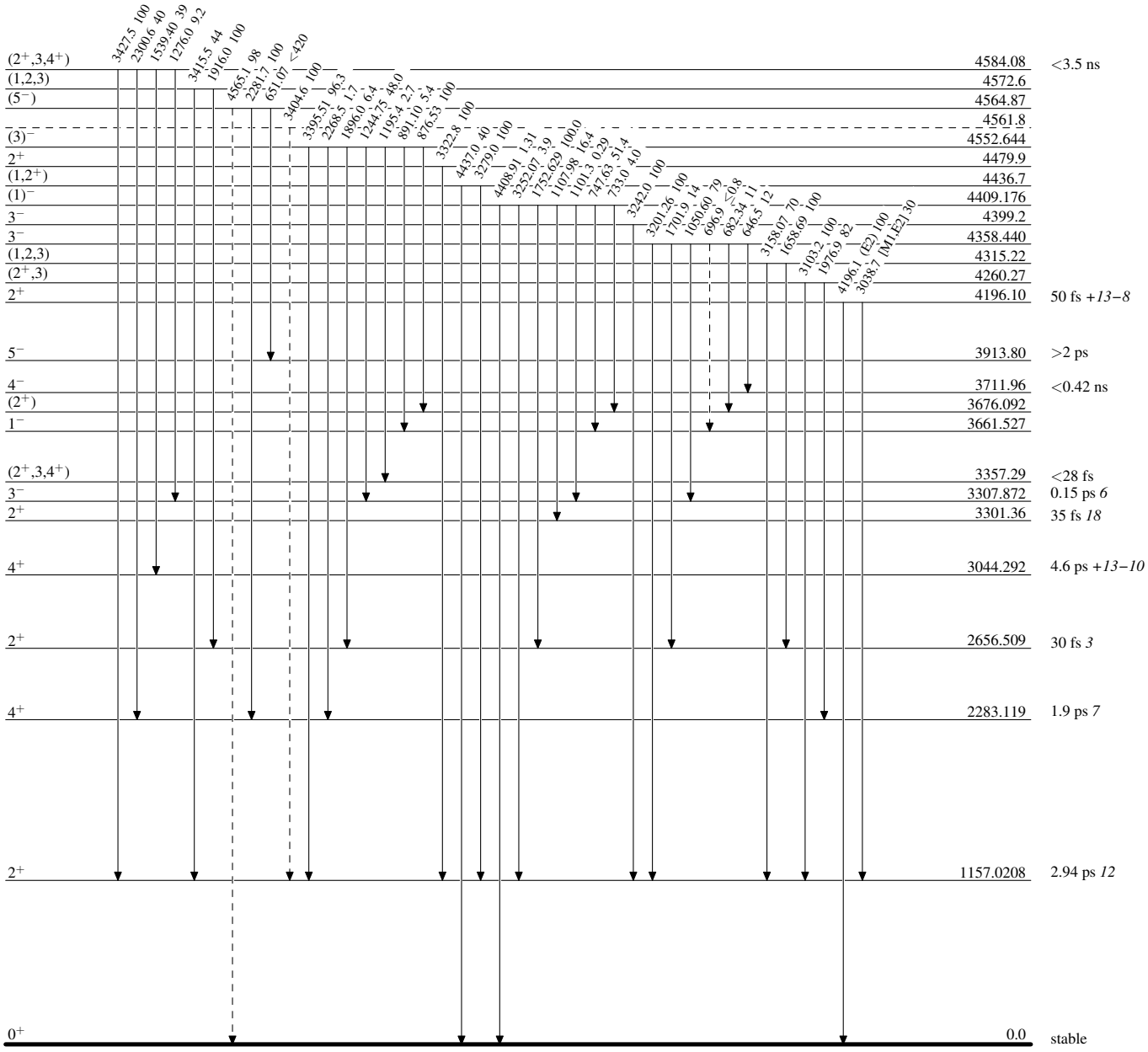
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

– – – – – – ► γ Decay (Uncertain)

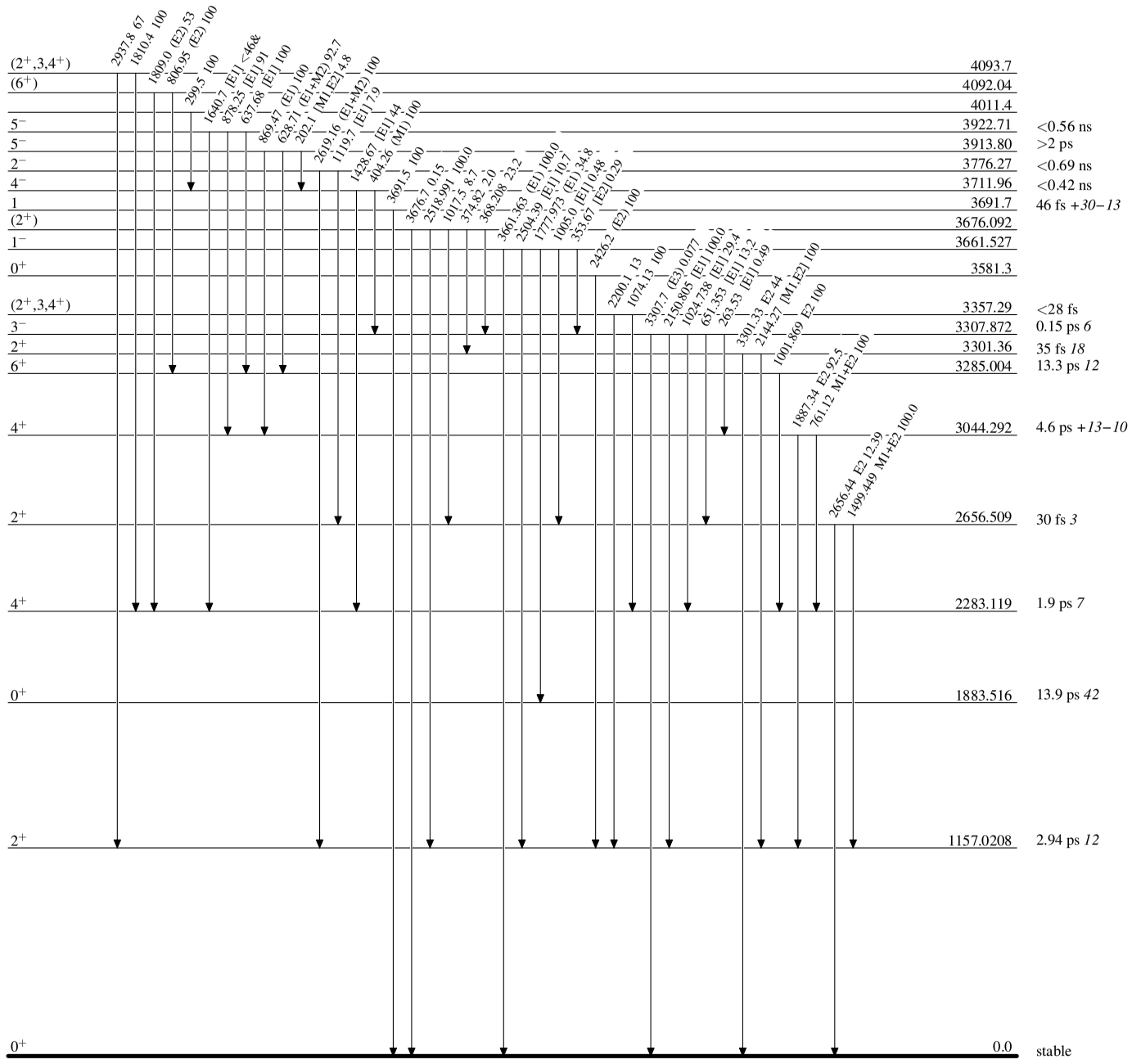


$^{44}_{20}Ca_{24}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



$^{44}_{20}Ca_{24}$

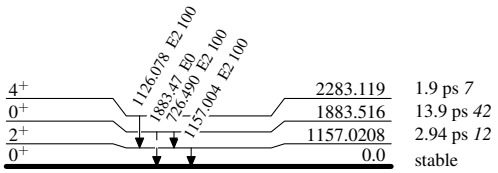
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

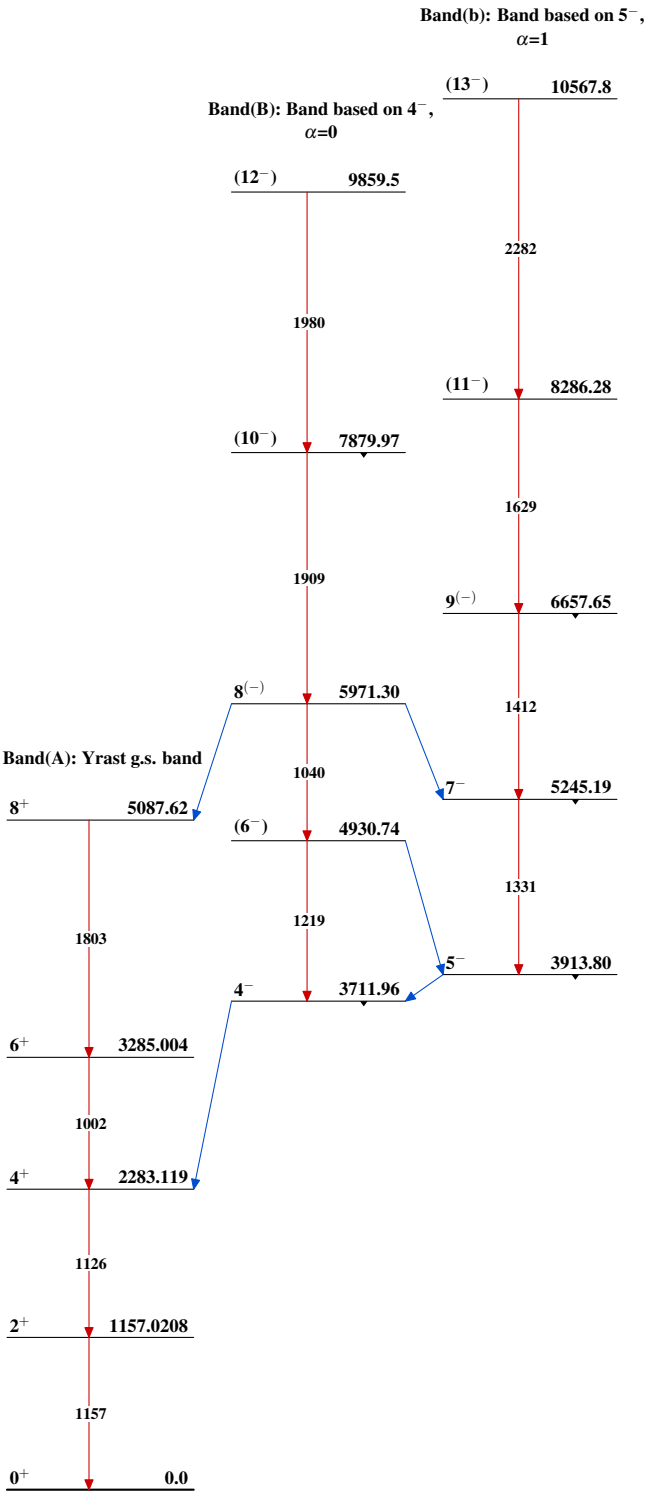
Legend

– – – – – – ► γ Decay (Uncertain)



$^{44}_{20}Ca_{24}$

Adopted Levels, Gammas



$^{44}_{20}Ca_{24}$