Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Q(β^-)=−13884.77 *23*; S(n)=16531.22 *3*; S(p)=11692.69 *1*; Q(α)=−9316.56 *1* 2021Wa16
S(2n)=29676.23 *16*, S(2p)=20486.805 *22* (2021Wa16).
Other reactions:
2004Be18, 2004Be08: ^{12}C(^{24}Mg, ^{12}C), E=130 MeV; measured Eγ, (particle)γ-coin.
2011Fr14: ^{12}C(^{13}C,n) E=12, 13.5, 20 MeV; measured reaction products ^{25}Mg; deduced ^{24}Mg excited states and reported resonance energies at 13.25 MeV *20* and 14.25 MeV *20*.
2001Di12: ^{11}B(^{13}N,X), (^{13}N,^{12}C), E=29.5, 45 MeV. Measured particle spectra, fusion σ. Deduced ^{24}Mg 6−α decay features, isospin purity/mixing in ^{24}Mg at excitation energy ~47 MeV, GDR γ-emission features.
2006Va20: ^{28}Si(p,p′X)^{24}Mg, E=1 GeV; measured Eγ; deduced σ.

^{24}Mg Levels

Cross Reference (XREF) Flags

A	^{24}Na β^- decay (14.956 h)	N	^{20}Ne(α,γ):Resonances	Others:	
B	^{24}Na β^- decay (20.18 ms)	O	^{20}Ne(α,α),(α,α'):Resonances	AA	Coulomb excitation
C	^{24}Al ε decay (2.053 s)	P	^{20}Ne(^{6}Li,d),(^{7}Li,t)	AB	^{24}Mg($\alpha,\alpha'\gamma$)
D	^{24}Al ε decay (130.7 ms)	Q	^{22}Ne(^{3}He,n)	AC	^{24}Mg(^{6}Li,^{6}Li′)
E	^{25}Si εp decay	R	^{23}Na(p,γ),(p,p′),(p,X),	AD	^{24}Mg(^{16}O,^{16}O′)
F	^{26}P ε2p decay	S	^{23}Na(^{3}He,d),(^{3}He,dγ)	AE	^{25}Mg(p,d)
G	^{28}P $\varepsilon\alpha$ decay	T	^{24}Mg(γ,γ')	AF	^{25}Mg(^{3}He,^{4}He)
H	^{12}C(^{12}C,γ)	U	^{24}Mg(e,e′)	AG	^{27}Al(μ^-,ν3nγ)
I	^{12}C(^{12}C,p):Resonances	V	^{24}Mg($\pi^+,\pi^{+\prime}$),($\pi^-,\pi^{-\prime}$)	AH	^{27}Al(p,α)
J	^{12}C(^{14}N,d)	W	^{24}Mg(p,p′),(pol p,p′),	AI	^{28}Si(d,^{6}Li)
K	^{12}C(^{24}Mg,^{12}Cγ)	X	^{24}Mg(n,n′γ)	AJ	^{28}Si(^{28}Si,Xγ)
L	^{12}C(^{16}O,α),(^{16}O,$\alpha\gamma$)	Y	^{24}Mg(^{3}He,^{3}He′)		
M	^{12}C(^{24}Mg,2^{12}C),(^{20}Ne,2^{12}C)	Z	^{24}Mg(α,α')		

E(level)[†]	J$^\pi$	T$_{1/2}$ or Γ[j]	XREF	Comments
0[p]	0$^+$	stable	ABCDEFGH JKL N PQRSTUVWXYZ	XREF: Others: AA, AB, AD, AE, AF, AG, AH, AI, AJ δ<r^2>(^{26}Mg,^{24}Mg)=+0.140 fm^2 *5* (stat) *25* (syst) (2012Yo01). <r^2>$^{1/2}$(^{24}Mg)=3.0570 *16* (charge radius) (2013An02 evaluation). Others: 3.0570 fm *7* (stat) *48* (syst) (2012Yo01), 3.030 fm *30* (1971Li26 − (e,e′)).
1368.667[p] *5*	2$^+$	1.36 ps *3*	A CDEF H JKL N PQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ μ=+1.08 *3*; Q=−0.29 *3* g=0.538 *13* (2015Ku05) T=0 (2015Ku05) J$^\pi$: L=2 in ^{24}Mg(p,p′). E2 to 0$^+$. T$_{1/2}$ or Γ: From τ=1.96 ps *5*: weighted average of mean lifetimes of (α,γ): 2.25 ps *9* (1973Br33), (^{16}O,α),(^{16}O,$\alpha\gamma$): 1.82 ps *14* (1974Fo11), 2.11 ps *16* (1970Al10), 2.09 ps *13* (1975Ho15), 2.07 ps *34* (1970Cu02); (e,e′): 1.9 ps *2* (1956He83), 1.87 ps *5* (1969Ti01), 1.9 ps *2* (1972Na06), 1.97 ps *11* (1974Jo10); (γ,γ'): 1.76 ps *21* (1981Ca10), 1.8 ps *2* (1977Ca14), 1.92 ps *15* (1971Sw07), 1.95 ps *26* (1966Sk01); Coul Ex: 1.91 ps *10* (1979Fe05), 1.92 ps *10* (1977Sc36), 2.00 ps *14* (1970Ha04), 2.02 ps *10* (1971Vi01), 1.93 ps *13* (1975Bi03), 1.65 ps *15* (1969Pe11); (p,γ): 1.97 ps *16*

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^{π}	$T_{1/2}$ or Γ[j]	XREF	Comments
				(1989Ke04), 2.00 ps *45* (1973Le15). Others τ: (α,α′γ): 1.44 ps *+11−9* (1968Ro05); (γ,γ′): 1.11 ps *13* (1970He01), 1.1 ps *2* (1965Ka15); (p,γ): 1.40 ps *45* (1972Me09) − omitted as outlier. μ: From 2020StZV, 2015Ku05 − Time Dependent Recoil in Vacuum. Other: +1.02 *4* from 2014StZZ − Recoil into Vacuum, Differential method (1975Ho15), Perturbed Angular Correlation after Ion Implantation (1974Eb02). Q: From 2021StZZ − Coulomb Excitation Reorientation (1990Gr11). Others: −0.18 *2* (1981Sp07), −0.178 *13* (13) (1979Fe05), −0.07 *3* (1981Ko06) − also listed in 2014StZZ. Uncertainty in g-factor includes 0.011 (statistical) and 0.007 (systematic).
4122.853[p] *12*	4^+	24.3 fs *21*	A C E H jKL N P RS U WXYZ	XREF: Others: AB, AD, AE, AF, AG, AH, AI, AJ μ=+1.7 *12* XREF: AJ(4115.1). J^{π}: L=4 in (α,α′) and in ^{24}Mg(p,p′); E2 to 2^+. $T_{1/2}$ or Γ: From mean lifetime τ=35 fs *3*: Weighted average of τ values from (^{16}O,α),(^{16}O,αγ): 53 fs *9* (1975Br10) and 48 fs *9* (1983Sp01); (p,γ),(p,p′): 32 fs *3*, 33 fs *2* (both from 1989Ke04), 40 fs *4* (1973Le15), 25 fs *5* (1972Me09); (^{3}He,d),(^{3}He,dγ): 68 fs *25* (1969An08); (n,n′γ): 56 fs *19* (1984El12); (p,p′),(pol p,p′): 65 fs *19* (1972Ba93); (α,α′γ): 51 fs *+33−28* (1968Ro05). Other: mean lifetime τ=169 fs *34* (outlier) (1971Ha32 − (α,α′γ)). μ: From 2020StZV, 1983Sp01 − Transient Field.
4238.35[q] *4*	2^+	45.7 fs *35*	A CDE H jKL N P RS UVWXYZ	XREF: Others: AB, AD, AE, AF, AG, AH, AI, AJ μ=+1.3 *4* J^{π}: L=2 in (α,α′) and ^{24}Mg(p,p′). $T_{1/2}$ or Γ: From τ=66 fs *5*: Weighted average of mean lifetimes (^{16}O,α),(^{16}O,αγ): τ=85 fs *15* (1975Br10), 110 fs *26* (1970Cu02 − revised value of τ=83 fs *16* (1968Cu05)); (p,γ),(p,p′): 66 fs *5*, 63 fs *5* (1989Ke04), 88 fs *11* (1973Le15), 53 fs *9* (1972Me09); (^{3}He,d),(^{3}He,dγ): τ=86 fs *30* (1969An08); (e,e′): 63 fs *10* (1974Jo10), 60 fs *6* (1978Za07), 69 fs *12* (1969Ti01); (p,p′),(pol p,p′): 120 fs *30* (1967AlZV), 95 fs *25* (1972Ba93); (α,α′γ): 101 fs *25*. Others: (α,α′γ): 185 fs *33* (1971Ha32); (n,n′γ): τ=105 fs *5* (1984El12). μ: From 2020StZV, 1983Sp01 − Transient Field.
5235.16[q] *5*	3^+	68 fs *5*	A C H JKL N RS W Y	XREF: Others: AB, AE, AF, AG, AH, AI, AJ XREF: AH(5251). J^{π}: L(p,d)=0+2, unnatural parity (^{16}O,α). Band assignment. L=3 in ^{24}Mg(p,p′) gives π=− is inconsistent. $T_{1/2}$ or Γ: From τ=98 fs *7*: weighted average of data from (^{16}O,α),(^{16}O,αγ): τ=109 fs 15 (1975Br10); (p,γ),(p,p′): 105 fs *16*, 101 fs *7* (1989Ke04), 65 fs *11* (1972Me09), 120 fs *16* (1973Le15); (^{3}He,d),(^{3}He,dγ): 95 fs *25* (1969An08); (p,p′),(pol p,p′): 130 fs *70* (1967AlZV) and 128 fs *32* (1972Ba93); (α,α′γ): 173 fs *46* (1971Ha32), 79 fs *+47−51* (1968Ro05).
6010.34[q] *5*	4^+	53 fs *4*	C H JKL N P RS UVWXYZ	XREF: Others: AB, AD, AE, AF, AH, AI, AJ μ=+2.1 *16* XREF: V(5.93E3)AD(6.1E3)AJ(6007.3).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
				J^π: L=4 in (α,α′) and ^{24}Mg(p,p′), natural parity (^{16}O,α). $T_{1/2}$ or Γ: From τ=77 fs *6*: weighted average of data from (^{3}He,d),(^{3}He,dγ): τ=50 fs 25 (1969An08); (p,p′),(pol p,p′): 85 fs *22* (1972Ba93); (^{16}O,α),(^{16}O,αγ): 77 fs *14* (1975Br10); (p,γ),(p,p′): 63 fs *10* and 83 fs *6* (1989Ke04); and 83 fs *10* (1973Le15), 46 fs *14* (1972Me09); (n,n′γ): 115 fs *20* (1984El12); (α,α′γ): 71 fs *+37−40* (1968Ro05). Others: (p,p′),(pol p,p′): 200 fs *40* (1967AlZV); (α,α′γ): 124 fs *20* (1971Ha32). μ: From 2020StZV, 1984Sp03 − Transient Field.
6432.2 *10*	0^+	69 fs *12*	JKL N PQR UVW YZ	XREF: Others: AB, AD, AE, AF, AH, AI XREF: AF(6448). J^π: L=0 in (α,α′) and ^{24}Mg(p,p′), natural parity in (^{16}O,α). $T_{1/2}$ or Γ: From τ=100 fs *17*: Weighted average of τ values from (^{16}O,α),(^{16}O,αγ): 66 fs *29* (1976Br34); (p,γ),(p,p′): 105 fs *45*, 140 fs *30* (1989Ke04), 110 fs *17* (1973Le15); and (p,p′),(pol p,p′): 77 fs *23* (1972Ba93). Others: (p,p′),(pol p,p′): 270 fs *60* (1967AlZV); (α,α′γ): 241 fs *+25−17* (1968Ro05); (p,γ),(p,p′): 66 fs *13* (1972Me09). Uncertainty of τ=100 fs *17* is the lowest input value.
7.0×10^3				XREF: Others: AD
7348.60 *10*	2^+	6.5 fs *22*	C JKL N P RS UVW YZ	XREF: Others: AD, AE, AF, AH, AI, AJ J^π: L=2 in (α,α′) and ^{24}Mg(p,p′), natural parity (^{16}O,α). $T_{1/2}$ or Γ: Weighted average of 4.5 fs *14* from (p,γ), 10 fs *2* from (e,e′), and 24 fs *11* from (p,p′).
7555.3 *10*	1^-	270[l] fs *55*	JKL N RS W YZ	XREF: Others: AD, AE, AF, AH XREF: J(7.58E3). J^π: L=1 in ^{24}Mg(p,p′), natural parity (^{16}O,α).
7616.41 *7*	3^-	1.01 ps *15*	C H KL N RS UVW YZ	XREF: Others: AE, AF, AH, AI XREF: V(7.55E3). J^π: L=3 in (α,α′) and ^{24}Mg(p,p′), natural parity (^{16}O,α). $T_{1/2}$ or Γ: From τ=1.46 ps *22*: Weighted average of τ values from (p,γ),(p,p′): 1.19 ps *20* (1989Ke04), 2.00 ps *55* (1973Le15); (p,p′),(pol p,p′): 2.1 ps *4* (1967AlZV) and 1.8 ps *6* (1972Ba93).
7747.7 *2*	1^+	12.5 fs *28*	L N RS W Y	XREF: Others: AF E(level): Other values: 7750 *3* (^{3}He,d) and 7746 *3* (p,p′). J^π: L(^{3}He,d)=0+2 and unnatural parity (^{16}O,α).
7812.4 *5*	$(4^-,5^+)$	21 fs *3*	C JKL N RS W Y	XREF: Others: AF, AH XREF: AH(7797). $T_{1/2}$ or Γ: Weighted average of 24 fs *3* (^{16}O,α) and 17 fs *4* (p,γ). J^π: γ to 3^+ and 4^+ states; and γ from 5^-. Unnatural parity (^{16}O,α).
8113.2[p] *10*	6^+	3.6 fs *12*	JKL P RS W Y	XREF: Others: AD, AF, AH, AI, AJ XREF: Y(8120)AJ(8104.7).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
				J^π: L=6 in (p,p′), natural parity (^{16}O,α). $T_{1/2}$ or Γ: Weighted average of 3.9 fs *21* (^{16}O,αγ) and 3.5 fs *12* (p,γ).
8358.1[‡] *3*	3^-	63 fs *8*	H jKL N RS UVW YZ	XREF: Others: AD, AF, AH, AI J^π: L=3 in (p,p′), natural parity (^{16}O,α). $T_{1/2}$ or Γ: Weighted average of 76 fs *38* (^{16}O,αγ), 54 fs *8* (p,γ), 76 fs *13* (e,e′), and 82 fs *17* (p,p′).
8438.4 *10*	1^-	9 fs *2*	jK N RS W YZ	XREF: Others: AB, AD, AH, AI T=0 J^π: D γ to 0^+ and L=1 in ^{24}Mg(p,p′).
8439.29 *5*	4^+	3.2 fs *14*	C H KL N R	XREF: Others: AF, AH J^π: γ to 2^+. log *ft*=3.93 from 4^+. Natural parity.
8654.9[‡] *4*	2^+	14 fs *3*	L N P RS W Y	XREF: Others: AF, AI E(level): Other values: 8655 *3* (^{3}He,d), 8654 *3* (p,p′), and 8661 *10* (^{3}He,^{4}He). J^π: L=2 in (p,p′), γ to 0^+, natural parity. $T_{1/2}$ or Γ: From τ=20 fs *5*: Unweighted ave. of data from (^{16}O,α),(^{16}O,αγ): t=28 fs *7* (1976Br34); (p,γ),(p,p′): 10 fs *2* (1989Ke04), 13 fs *5* (1972Me09), and 29 fs *7* (1973Le15).
8864.5[‡] *2*	2^-	5.5 fs *21*	L N RS W Y	XREF: Others: AF, AI E(level): Others: 8870 *3* (^{3}He,d), 8864 *3* (p,p′), and 8866 *10* (^{3}He,^{4}He). J^π: 2 from γγ(θ) in ^{23}Na(p,γ)) (1969Ba47). Unnatural parity (^{16}O,α).
9003.5[‡] *2*	2^+	8.4[m] fs *12*	L N RS U W YZ	XREF: Others: AB, AF, AI E(level): Others: 8995 *21* from (e,e′), 9002 *3* from (p,p′), and 9012 *10* from (^{3}He,^{4}He). J^π: L=2 in (p,p′). Natural parity (^{16}O,α).
9146.2[‡] *3*	1^-		L RS W YZ	XREF: Others: AB, AF, AI XREF: S(9166)AF(9166). J^π: L=1 in (p,p′). Natural parity (^{16}O,α).
9160 *15*	$[5^-]$[h]		J	
9284.4 *3*	$2^+,4^+$	11 fs *3*	H KL N RS u W Y	XREF: Others: AF J^π: L=2 in (^{3}He,d), natural parity (^{16}O,α), γ from (3^-) and 4^+.
9299.8[‡] *3*			K n R	
9301.07 *9*	(4^+)	7 fs *2*	C H L n R VW	J^π: γ′s to 2^+ and 4^+. log *ft*=4.8 from 4^+ in ^{24}Al ε decay (2.053 s).
9305.39 *24*	0^+	173[n] fs *35*	L R u Z	J^π: From ^{24}Mg(α,α′), based on comparison of differential cross sections to DWBA calculations.
9450 *15*	$[5^-,6^+]$[h]		J	XREF: Others: AI
9457.81 *4*	$(3)^+$	4.3 fs *21*	C L N RS W Y	XREF: Others: AF J^π: L=2 in (^{3}He,d), in (^{3}He,^{4}He), and in (^{3}He,^{3}He′); γ′s to 1^+ and 4^+. Tentative unnatural parity in (^{16}O,α).
9516.18 *5*	4^+	12 fs *5*	C L N RS W	XREF: Others: AF T=1 J^π: γ′s to 2^+ and 4^+, isobaric analog to ^{24}Na ground state. Natural parity (^{16}O,α). L(^{3}He,d)=2.
9527.6[q] *7*	(6^+)	8[n] fs *4*	KL W Y	XREF: Others: AF, AI, AJ XREF: W(9521)Y(9520)AJ(9523).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$ or Γ[j]	XREF	Comments
				J$^\pi$: L=(6) in (^{3}He,^{3}He′); band member in (^{24}Mg,^{12}Cγ).
9532.7[‡] *2*	$(2,3)^+$	14 fs *7*	R W	XREF: Others: AF, AI T=0 XREF: AF(9650). J$^\pi$: L(p,p′)=2 and γ to 3^-. T$_{1/2}$ or Γ: Weighted average of 34 fs *14* (p,p′),(pol p,p′) and 11 fs *5* (p,γ),(p,p′).
9828.0[‡] *20*	1^+	0.30[m] fs *7*	D N RSTU W Y	XREF: Others: AF T=0&1 J$^\pi$: Log *ft*=4.6 from 1^+; γ to 0^+; D γ from 0^+ at 13048.
9940 *15*	$[5^-]$[h]		J	
9965.3 *11*	1^+	71[m] as *7*	D N RSTU W	XREF: Others: AF T=1 J$^\pi$: Log *ft*=3.5 from 1^+; γ to 0^+. T$_{1/2}$ or Γ: Weighted average of 93 as *18* from (γ,γ′) and 69 as *6* from (e,e′).
10027.97[‡] *9*	5^-	62[n] fs *18*	H KL N RS VW Y	XREF: Others: AI T=0 XREF: V(9.97E3). J$^\pi$: L=5 in (p,p′) and in (^{3}He,^{3}He′), natural parity (^{16}O,α).
10059.1[‡] *4*	$(1,2)^+$	<3 fs	D L N RS W	XREF: Others: AF T=1 E(level): Other: Least-squares fit yields 10059 *3*. J$^\pi$: log *ft*=4.5 from 1^+, L=(0)+2 (^{3}He,d).
10110.9[‡] *4*	(0^+)	<5[o] keV	L N R W Y	T=0 J$^\pi$: L=0 in (^{3}He,^{3}He′); also in 1968Ol04 (^{16}O,$\alpha\gamma$), based on simultaneous fits to the angular correlations of the two cascade gamma rays involved.
10161 *3*	(0^+)		L N S W	XREF: Others: AF J$^\pi$: L=0 in (p,p′). γ to 2^+. Tentative L(^{3}He,d)=(1) inconsistent for π=+. E(level): From (p,p′),(pol p,p′).
10250 *15*	$[4^+,5^-]$[h]		J	
10333.6[‡] *2*	3^-[c]	<7[o] keV	H L N RS W	T=0 J$^\pi$: L=3 in (p,p′).
10360.7[‡] *3*	2^+	1.0 fs *3*	KL N RSTU W YZ	XREF: Others: AF, AI T=0 T$_{1/2}$ or Γ: weighted average of 0.8 fs *2* from (γ,γ′) and 1.3 fs *3* from (e,e′). J$^\pi$: L=2 in (α,α′), ^{24}Mg(p,p′) and (^{3}He,^{3}He′); γ′s to 0^+.
10575.93 *8*	$(4)^+$	9[n] fs *2*	C J L N S w	XREF: Others: AI T=0 XREF: J(10490). J$^\pi$: L=4 in (p,p′) for doublet. log *ft*=4.5 in from 4^+ in ^{24}Al ε decay (2.053 s).
10581.26[‡] *13*	$(2^+,3^+,4^+)$	<2 fs	R w	XREF: Others: AF, AI J$^\pi$: γ′s to 2^+ and 4^+. L=4 in (p,p′) for doublet.
10659.8[‡] *2*	$(1,2^+)$		L Rs	J$^\pi$: γ′s to 0^+ and 2^+.

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
10660.17[‡] *17*	(3^+,4^+)	<2 fs	N Rs W	J^π: γ's to 3^+ and 4^+. L=4 in (p,p′) for doublet.
10679.7[‡] *3*	0^+	2.1[n] eV *8*	D L N Rs W YZ	XREF: Others: AF T=0 J^π: Spin=0 from $\gamma\gamma(\theta)$ in (α,γ); π=+ from L=2 in (^{3}He,^{4}He). Also L=0 in (^{3}He,^{3}He′).
10712.2[‡] *2*	1^+	23[m] as *2*	L R TU W	T=1 J^π: M1 excitation in (e,e′) and (γ,γ′).
10731.1[‡] *2*	2^+	7 fs *3*	L N RS W	XREF: Others: AF T=0 J^π: 6491.8γ D to 2^+, ΔJ=0; π=+ from L(=3He,d)=0+2.
10820.8 *4*	3^+,4^+	7.5[n] eV *11*	C L N RS W Y	XREF: Others: AF XREF: S(10838). J^π: γ to 2^+, L=4 in ^{24}Mg(p,p′), and RUL.
10917.2[‡] *3*	2^+	0.8[m] fs *1*	D L N RSTU W Y	XREF: Others: AF, AI T=0 XREF: U(10939). J^π: L=2 in (^{3}He,^{4}He), (^{3}He,d), and (^{3}He,^{3}He′); γ's to 0^+ and 4^+, and RUL.
11012 *3*	3,5^+[c]		L N s	T=1 E(level): Weighted average of 11008 *4* (^{16}O,α) and 11014 *3* (α,γ).
11018 *3*	2^+	<3[o] keV	D L N s vW Y	XREF: Others: AF, AI T=0 E(level): Weighted average of 11017 *3* from (p,p′), 11018 *4* from (^{16}O,α), 11020 *3* from (α,γ), 11022 *10* from (^{3}He,^{4}He), 11016 *7* (d,^{6}Li). J^π: L=2 in (^{3}He,^{3}He′); γ's to 0^+ and 4^+; and RUL; also in (α,γ) based on $\alpha\gamma(\theta)$ for spin 2.
11133 *3*		26[n] fs *4*	L N vW	E(level): From (α,γ). Others: 11128 *3* (^{16}O,α), 11128 *3* (p,p′).
11150 *15*	[6^+,7^-][h]		J	
11165 *2*	3^-	<3[o] keV	L N W Y	T=0 E(level): Weighted average of 11161 *4* (^{16}O,α), 11167 *2* (α,γ), and 11161 *3* (p,p′). J^π: L=3 in (p,p′) and (^{3}He,^{3}He′); spin=3 from $\alpha\gamma(\theta)$ in (α,γ).
11181 *3*			L N W	E(level): From (p,p′),(pol p,p′). Others: 11182 *4* (^{16}O,α) and 11185 (α,γ). J^π: L=3 in (p,p′) possibly for doublet.
11187.3[‡] *3*			K N R W	
11207 *3*		0.0022[n] eV *12*	L N R W	T=0&1 XREF: N(11215). E(level): From (p,p′).
11216.69[‡] *18*	3^+,4^+	0.78[n] eV *11*	C L N R W Y	XREF: Others: AF T=0 XREF: N(11226)AF(11228). J^π: L=4 in (p,p′) and (^{3}He,^{3}He′); γ to 2^+.
11293 *3*		20[n] fs *3*	L N s W	E(level): From (p,p′).
11314.4 *15*	(3,4)$^+$		C L N s W Y	XREF: Others: AF

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
				J^π: log *ft*=5.2 in ^{24}Al ε decay (2.053 s). γ to 2^+.
11330 *3*			L N Rs W	E(level): From (p,p′).
11390 *20*	0^+[i]		Z	
11391 *3*	1^-	0.5[o] keV	L NO Rs U W Y	XREF: Others: AF T=0 E(level): Weighted average of 11390 *4* (^{16}O,α), 11395 *3* (α,γ), 11390 *5* (α,α), 11389 *3* (p,p′). J^π: L=1 in (p,p′) and (^{3}He,^{3}He′); γ to 0^+.
11394[#] *4*			L s	XREF: Others: AF L(^{3}He,^{4}He)=1 probably for a doublet.
11452.8[‡] *4*	2^+	<2[o] keV	L N R u W Y	T=0 J^π: L=2 in (p,p′) and (^{3}He,^{3}He′).
11457 *3*	(0^+)[&]		D NO S	XREF: Others: AF T=0 E(level): Weighted average of 11455 *4* (^{16}O,α), 11461 *4* (α,γ), 11460 *5* (α,α), 11457 *3* (^{3}He,d), and 11456 *3* (p,p′).
11522 *2*	2^+	0.5[o] keV	D L N Rs U W Y	XREF: Others: AF T=0 XREF: U(11474). E(level): Weighted average of 11523 *2* (α,γ), 11519 *4* (^{16}O,α), and 11521 *3* (p,p′). J^π: L=2 in (p,p′) and spin=2 from αγ(θ) in (α,γ).
11527 *4*	(2^+)[&]		J L O s	XREF: Others: AF E(level): Weighted average of 11528 *4* (^{16}O,α), 11526 *5* (α,α).
11568	(2^+)		Y	J^π: L=2 in (^{3}He,^{3}He′).
11600 *2*	3^-	15[n] fs *4*	L N W	XREF: Others: AF, AI T=0 E(level): From (α,γ). J^π: spin=3 from αγ(θ) in (α,γ), natural parity (^{16}O,α).
11618 *3*			L N W	E(level): From (p,p′).
11698.2 *13*	4^+	1.6[n] eV *6*	C L N S W	XREF: Others: AF, AI T=0 E(level): Weighted average of 11700 *2* (α,γ), 11698.6 *13* (^{3}He,d), 11694 *3* (p,p′), 11694 *4* (^{16}O,α), and 11701 *10* (^{3}He,^{4}He). J^π: L=4 in (p,p′); spin=4 from αγ(θ) in (α,γ).
11730 *2*	0^+[i]	10[o] keV *2*	L NO S W Z	T=0 E(level): Weighted average of 11727 *4* (^{16}O,α), 11732 *2* (α,γ), 11735 *5* (α,α), 11724 *5* (^{3}He,d), and 11727 *3* (p,p′). J^π: L=0 in (p,p′).
11830 *2*			J L N S W	XREF: J(11810). E(level): Weighted average of 11827 *4* (^{16}O,α), 11831.7 *18* (^{3}He,d), and 11828 *3* (p,p′).
11860[‡] *2*	(8^+)	63[n] fs *24*	KL N	XREF: Others: AI XREF: N(11865). J^π: From linear polarization measurements (1978We03) (^{16}O,αγ); γ to 6^+; π=N (^{16}O,α). The possibility of 6^+ assignment discarded with 85% confidence (1978We03). $T_{1/2}$ or Γ: From (^{16}O,α).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
11862.8 *13*	1^-[i]	7.0[o] keV *3*	NO RS W Z	T=0 E(level): Weighted average of 11868 *5* (α,α′), 11869 *3* (α,γ), 11862.7 *12* (^{3}He,d), 11862 *3* (p,p′), and 11860 *2* (p,γ). J^π: L=1 in (p,p′); spin=1 from αγ(θ) in (α,γ).
11909 *2*		5.5[o] keV *22*	N R	T=0 E(level): Weighted average of 11904 *4* (α,γ) and 11910 *2* (p,γ),(p,p′),(p,x).
11932.9[‡] *2*	$(3)^+$	<0.02 keV	L N RS W	XREF: Others: AF J^π: L(3He,d)=2,0+2; γ to 2^+ and 2^- and 4^+ and $(4^-,5^+)$.
11966.6[‡] *5*	2^+	2.0 keV *4*	L NO RS W	T=0 J^π: L=2 in (p,p′); spin=2 from αγ(θ) in (α,γ). $T_{1/2}$ or Γ: Weighted average of 2.4 keV *5* (α,γ) and 1.8 keV *4* (p,γ).
11988.5[‡] *1*	2^+	<0.02 keV	L RS W	XREF: Others: AI T=0 J^π: L=2 in (p,p′); L=0+2 in (^{3}He,d); γ to 2^+,4^+.
12003 *3*		<1[o] keV	N W	T=0 E(level): Weighted average of 12004 *4* (α,γ) and 12002 *3* (p,p′).
12017.2[‡] *6*	3^-	0.7 keV *2*	N RS U W	T=0 XREF: U(11990). J^π: L=3 in (p,p′); L(^{3}He,d)=1; populated in (α,γ) implies natural parity. In (e,e′) 11990 keV*25* overlaps two lower levels; $J^\pi=3^-$ implies excitation of this level.
12051.3[‡] *5*	4^+	<0.02 keV	C N RS VW	XREF: Others: AF T=0&1 J^π: L=4 in (p,p′); populated in (α,γ) implies natural parity.
12119.0[‡] *10*	4^+[f]	1.9[o] keV *3*	C L N R W	T=0 J^π: log *ft*=5.3 from 4^+; γ′s to 2^+ and 4^+; populated in (α,γ) implies natural parity.
12128[‡] *3*			R W	
12162 *3*	4^+	0.9[o] keV *3*	C N W	T=0 E(level): Weighted average of 12163 *4* (α,γ) and 12161 *3* (p,p′). J^π: L=4 in (p,p′); populated in (α,γ): resonance – implies natural parity.
12183.3[‡] *1*		<0.046 keV	R W	γ′s to 0^+ and 4^+.
12244 *3*			W	
12259.3[‡] *5*	2^-	<0.06 keV	R W	J^π: From (p,γ) 1963Gl05, based on γ(θ) and γ-γ correlation measurements. L=3 in (p,p′) for doublet.
12259.8[‡] *4*	3^-	1.8[o] keV *3*	N R W	T=0 J^π: From 1956Ba96, based on elastic scattering (p_0) in ^{23}Na(p,p). L=3 in (p,p′) for doublet.
12273 *5*	(3^-)[&]		O	
12340 *15*	$[7^+]$[h]		J	
12340.2[‡] *4*	3^+	<0.07 keV	R W	J^π: From (p,γ) 1963Gl05, based on γ(θ) and γ-γ correlation measurements.
12342 *3*		3.5[n] fs *14*	L W	E(level): From (p,p′),(pol p,p′).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$ or Γ[j]	XREF	Comments
12385	0$^-$[d]	7 keV *2*	R	
12400.3[‡] *5*	3$^+$	<0.09 keV	R	T=0 J$^\pi$: From 1963Gl05, based on $\gamma(\theta)$ and γ-γ angular correlation measurements.
12404.9[‡] *5*	2$^+$	<0.1 keV	D N R W	T=0&1 J$^\pi$: L=2 in (p,p′); Log *ft*=5.5 from 1$^+$; γ to 4$^+$.
12443 *3*	6$^+$,7$^-$	11[n] fs *3*	L N W	T=0 E(level): Weighted average of 12446 *4* (α,γ) and 12441 *3* (p,p′). J$^\pi$: From $\alpha\gamma\gamma$ angular correlations ((^{16}O,$\alpha\gamma$) – 2012Di04).
12450 *3*	1$^-$[d]	5.7[o] keV *4*	N R W	T=0 E(level): Weighted average of 12456 *4* (α,γ) and 12447 *3* (p,p′).
12467 *3*	2$^+$	5.1[k] keV *1*	D NO W	T=0 E(level): Weighted average of 12467 *4* (α,γ), 12466 *5* (α,α), and 12467 *3* (p,p′). J$^\pi$: L=2 in (p,p′).
12478 *3*	2$^+$[&d]	3.8[o] keV *3*	NO R W	E(level): Weighted average of 12472 *4* (α,γ), 12484 *5* (α,α), and 12479 *3* (p,p′); populated in (α,γ), (α,α) resonances – implies natural parity.
12507 *3*	4$^+$	2.3[o] keV *3*	NO R W	T=0 XREF: O(12515). E(level): Weighted average of 12508 *4* (α,γ), 12515 *5* (α,α), and 12504 *3* (p,p′). J$^\pi$: L=4 in (p,p′); populated in (α,γ), (α,α) resonances – implies natural parity.
12527.6[‡] *6*	1$^+$[d]	7.5 keV *10*	L R U W	T=0&1 XREF: L(12.54E3). J$^\pi$: 2$^+$ in (e,e′) for 12522 *30* (larger uncertainty) is inconsistent.
12581 *3*	2$^+$[d]	5.5 keV *6*	NO R W	T=0 E(level): Unweighted average of 12580 *4* (α,γ), 12587 *2* (α,α), and 12577 *3* (p,p′). J$^\pi$: L=2 in (p,p′). T$_{1/2}$ or Γ: Weighted average of 6.2 keV *6* (α,γ), 5.2 keV *9* (α,α), and 4 keV *1* (p,γ).
12638.7[‡] *1*	4$^+$	0.03 keV *2*	L N R W	T=0&1 J$^\pi$: L=4 in (p,p′); populated in (α,γ): resonance – implies natural parity.
12659.1[‡] *1*		0.08 keV *8*	R W	
12660.8[‡] *5*	3$^-$	0.9[o] keV *3*	NO R W	T=0 J$^\pi$: L=3 in (p,p′).
12670.0[‡] *5*	2$^-$[d]	4.0 keV *5*	R U W	T=1 J$^\pi$: 8430.1γ D to 2$^+$, ΔJ=0.
12733.3[‡] *6*		<0.6 keV	o R U	XREF: U(12706).
12739.0[‡] *7*	2$^+$	8.0[o] keV *7*	No R W	T=0 J$^\pi$: L=2 in (p,p′); populated in (α,γ): resonance – implies natural parity. T$_{1/2}$ or Γ: weighted average of 8.3 keV *5* from (α,γ) and 6.7 keV *10* from (p,γ).
12744 *1*	(2$^+$)[a]	11[k] keV *2*	O	

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
12747 *2*	(4^+)[a]	2[k] keV *2*	O	
12778[‡] *1*	2^+[e]	30 keV *5*	O R W	T=0
12784 *2*	(1^-)[a]	28[k] keV *4*	O	
12807.8[‡] *5*	2^+	1.8 keV *6*	N R W	T=0 J^π: L=2 in (p,p′); populated in (α,γ): resonance – implies natural parity. $T_{1/2}$ or Γ: Unweighted average of 2.3 keV *3* (α,γ) and 1.2 keV *1* (p,γ).
12818.1[‡] *2*	1^+[de]	2.3 keV *4*	O R	T=0&1
12846.9[‡] *5*	$(3^-,4^+)$	0.2 keV *1*	L R W	T=0 J^π: L=3 or 4 in (p,p′).
12852.3[‡] *5*		0.3 keV *1*	N R	T=0
12854 *1*	$(1^+,2^+,3^+)$	0.4 keV *1*	R	J^π: γ to 0^+ and 3^+. Others: $(1^+,2,3^-)$ in 1972Me09; (0^-) in 1987Va24 probably erroneous – both in (p,γ),(p,p′),(p,x).
12861 *3*	$2^+,3^-$	<1[o] keV	N W	T=0 E(level): From (p,p′),(pol p,p′). J^π: γ′s to 1^- and 4^+.
12895.1[‡] *5*	1^+[de]	0.3 keV *2*	R W	T=0
12921.6[‡] *5*	$(2^+,3^-,4^+)$	6.5 keV *5*	N R W	T=0&1 J^π: γ′s to 2^+ and 4^+; populated in (α,γ): resonance – implies natural parity. $T_{1/2}$ or Γ: Weighted average of 6.7 keV *6* (α,γ) and 6.3 keV *5* (p,γ).
12955.5[‡] *1*	1^+	1.9 keV *1*	L R W	T=1 J^π: 1 from $\gamma\gamma(\theta)$ measurements in ^{23}Na(p,γ) (1969Ba47); γ′s to 0^+ and 2^+. 1^+ in 1987Va24 – ^{23}Na(p,x).
12963.9[‡] *5*	2^-[e]	3.5 keV *2*	R W	T=0
12967.9 *5*		<1.5 keV	R	
12975 *3*	4^+	3.3[o] keV *3*	C NO W	T=0 XREF: O(12983). E(level): Weighted average of 12973 *3* (p,p′), 12977 *4* (α,γ), and 12983 *10* (α,α). J^π: L=4 in (p,p′).
12997.9[‡] *5*		0.3 keV *2*	O QR U W	XREF: O(13005?).
13029.8[‡] *1*	$2^+,3^-$[e]	0.7 keV *1*	R W	T=1 γ′s to 1^- and 4^+. 2^+ in (p,γ),(p,p′),(p,x).
13048 *2*	0^+	3.0 keV *7*	L NO R W	T=1 E(level): Weighted average of 13047 *4* (α,γ), 13049 *2* (p,γ), and 13047 *3* (p,p′). J^π: D γ to 1^+, based on $\gamma\gamma(\theta)$ in (α,γ); populated in (α,γ), (α,α') resonances – implies natural parity. $T_{1/2}$ or Γ: Unweighted average of 2.3 keV *4* (α,γ) and 3.7 keV *5* (p,γ).
13050.0[‡] *1*	4^+[d]	0.09 keV *3*	N R W	T=0&1 J^π: L=4 in (p,p′); populated in (α,γ) resonance – implies natural parity.
13057 *3*	5^-[f]	<1[o] keV	L N W	T=0 XREF: L(13070). E(level): Weighted average of 13070 *20* (^{16}O,α), 13061 *4* (α,γ), and 13055 *3* (p,p′).

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
13088.8[‡] *5*	2^+	9 keV *3*	N R W	T=0&1 J^π: L=2,3 in (p,p′), γ to 4^+ and 0^+. $T_{1/2}$ or Γ: Unweighted average of 11.9 keV *6* (α,γ), and 6.4 keV *7* (p,γ).
13095 *2*	(2^+)[a]	14[k] keV *3*	O	
13133 *3*	0^+[i]	7 keV *1*	J N R Z	T=0 E(level): Weighted average of 13136 *4* (α,γ) and 13132 *3* (p,γ). $T_{1/2}$ or Γ: Weighted average of 9 keV *2* (α,γ) and 6 keV *1* (p,γ).
13138 *3*		5.4[o] keV *5*	N R W	T=0 XREF: N(13141). E(level): Weighted average of 13141 *4* (α,γ) and 13137 *3* (p,p′).
13146		3.2 keV *5*	R	
13160.5[‡] *7*		1.7 keV *7*	R W	T=0
13178 *3*			W z	
13184.6[‡] *8*		5.6[o] keV *4*	N R W z	T=0
13196 *2*	0^+[i]	2.7[o] keV *4*	I NO R W z	T=0 E(level): Weighted average of 13202 *4* (α,γ), 13194 *2* (α,α), and 13198 *3* (p,p′). J^π: From $\alpha_0(\theta)$ in ^{23}Na(p,X), X=α_0. $T_{1/2}$ or Γ: Others: 12 keV *3* (α,α),(α,α′); 3 keV *1* (p,γ).
13206 *2*	(4^+)[a]	14[k] keV *3*	O	
13212.8		2.3[n] fs *12*	KL	
13260 *4*	1^-[e]	36[o] keV *3*	N R V	T=0 E(level): From (α,γ).
13268.7 *7*	$(1)^+$[e]	≈8 keV	R	
13275.5 *10*		≈2 keV	R	T=0
13335 *3*	1^-[e]	33[o] keV *3*	N R	T=0 E(level): Weighted average of 13338 *4* from (α,γ), 13334 *3* from (p,γ).
13345.7[‡] *6*	3^-	0.6 keV *2*	O R W	T=0&1 J^π: L=3 in (p,p′). $T_{1/2}$ or Γ: Other: 42 keV *3* (α,α),(α,α′).
13352			R	
13355.0 *8*	2^-[e]	15.2 keV *2*	R	
13366.9[‡] *8*	(2)	1.6 keV *7*	R U	T=1 XREF: U(13371). J^π: γ to 0^+ and $(4^-,5^+)$.
13370 *10*	0^+[i]		Z	
13390 *15*	$[7^-]$[h]		J	
13413 *4*		2.8[o] keV *3*	No	
13419.3 *8*		3.2 keV *7*	no R	T=0 $T_{1/2}$ or Γ: From (α,γ) for doublet.
13424.7[‡] *12*		3.2 keV *7*	no R	T=0 $T_{1/2}$ or Γ: From (α,γ) for doublet.
13437 *4*	3^-	15.0[o] keV *25*	No W	T=0 E(level): Weighted average of 13436 *4* (α,γ) and 13440 *7* (p,p′). J^π: L(p,p′)=3; populated in (α,γ): resonance – implies natural parity.
13446.8[‡] *8*	(1,2)	<0.4 keV	No R	T=0

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
				J^π: γ to 0^+ and 1^- and 2^+.
13450[#] *20*	6^+[f]	<15[n] keV	J L	
13452.4 *8*	2^+,(1^+)[e]	3.2 keV *7*	R	T=0
13474.9[‡] *8*	2^+,3,4^+	<1 keV	R	J^π: γ's to 2^+ and 4^+.
13482.9[‡] *8*		1.2[o] keV *3*	N R	T=0
13542.3 *8*		6.9 keV *10*	R	T=0
13585[‡]	$(1)^-$[e]	21 keV *2*	n R	T=0 $T_{1/2}$ or Γ: From (α,γ).
13587.1[‡] *10*	1^-[a]	8.0 keV *10*	nO R	T=0 J^π: Also from $\alpha_0(\theta)$ in ^{23}Na(p,X), X=α_0 T Other: and 33 keV *5* (α,α) is comparable with 21 keV *2* of 13585 level, however, the level energy 13589 *2* matches with this level.
13632.6 *11*		2.1 keV *12*	R	T=0
13677.4[‡] *9*		6.5[k] keV *17*	N R	T=0 $T_{1/2}$ or Γ: Unweighted average of 4.8 keV *8* (α,γ) and 8.2 keV *5* (p,γ).
13686[‡] *1*	2^-[e]	23 keV *3*	C O R	
13708	(3^-)[b]	≈130[k] keV	O	
13722 *4*	2^+	4.3[o] keV *3*	N R	T=0 E(level): From (α,γ). J^π: From $\alpha_0(\theta)$ in ^{23}Na(p,X), X=α_0.
13738 *1*	(2^+)[a]	13[k] keV *3*	O	
13771 *3*	5^-[e]	5.5 keV *23*	N R	T=0 E(level): Weighted average of 13768 *4* (α,γ) and 13772 *3* (p,γ). J^π: From L(p,α_0)=5 (1987Va24); $T_{1/2}$ or Γ: Unweighted average of 3.2 keV *4* (α,γ) and 7.8 keV *10* (p,γ).
13788 *10*	(4^+)[b]	≈21[k] keV	O	E(level): Weighted average of 13786 *10* from (α,α), and 13790 *10* from ^{24}Mg(α,α'). Uncertainty is the input value.
13800 *3*	0^+[i]	4.5[o] keV *7*	N R Z	T=0 XREF: Z(13790). $T_{1/2}$ or Γ: Weighted average of 4.4 keV *4* (α,γ) and 8 keV *2* (p,γ).
13813 *3*	1^-[e]	24 keV *4*	R	
13819 *2*	2^-[e]	39 keV *9*	R	T=0
13841 *3*		2.5 keV *5*	l R	
13850 *4*		<1[o] keV	l N	T=0
13882[‡] *2*	1^+[e]	2.0 keV *2*	O R	T=0 XREF: O(13868).
13886[‡] *3*	2^+[e]	38 keV *8*	O R	T=0 XREF: O(13890). Γ: Weighted average of 32 keV *8* (α,α) and 48 keV *10* (p,γ).
13893[‡] *3*	0^+[i]	13 keV *2*	N R Z	T=0 XREF: N(13885)Z(13890). Γ: weighted average of 12.0 keV *18* (α,γ) and 15 keV *3* (p,γ).
13910 *1*	4^+[a]	18[k] keV *3*	O	
13933 *2*	$(1,2,3)^+$[e]	3.0 keV *6*	R	T=0
13948 *3*	1^+[e]	4.0 keV *8*	R	T=0

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
13984 *3*	$(1,2,3)^{+}$[e]	4.9 keV *5*	R	T=0
14019 *4*	3^{-}[e]		O R V	T=0 XREF: V(13.96E3). E(level): Weighted average of 14007 *10* (α,α) and 14020 *3* (p,γ).
14026[‡] *3*	2^{+}[e]	5.1 keV *8*	N R	T=0 $T_{1/2}$ or Γ: Weighted average of 6.2 keV *7* (α,γ) and 4.5 keV *5* (p,γ).
14037 *2*	(1^{-})[a]	21[k] keV *4*	O	
14060 *10*		<4[k] keV	O	
14079 *4*		24[o] keV *5*	NO	E(level): Unweighted average of 14080 *4* (α,γ) and 14077 (α,α). Uncertainty from (α,γ).
14081 *3*	1^{+}[e]	6.0 keV *6*	NO R	T=0 XREF: O(14091). E(level): Weighted average of 14084 *4* (α,γ) and 14080 *3* (p,γ).
14101 *4*		1.4[o] keV *4*	j NO	T=0 XREF: O(14097). E(level): From (α,γ).
14150 *4*	8^{+}[f]	1.8[o] keV *4*	j L N	T=0 E(level): From (α,γ).
14152 *4*		6.2[o] keV *7*	N W	T=0 E(level): From (α,γ).
14157 *4*			N	T=0
14165 *1*	(4^{+})[a]	11.1[k] keV *19*	O	
14245 *4*		11.3[o] keV *14*	N	T=0
14264 *1*	(4^{+})[a]	16[k] keV *2*	O	
14329 *4*	4^{+}[f]	<1[o] keV	L N	T=0 E(level): From (α,γ).
14355 *12*	(3^{-})[a]	112[k] keV *29*	O	
14397 *2*	4^{+}[af]	12[k] keV *3*	L O	T=0 XREF: L(14410).
14461[@] *10*		46[k] keV	OP	
14500			W	
14568 *10*	$(3^{-},5^{-})$[a]	<13[k] keV	L O	XREF: L(14560).
14582 *10*		61[k] keV	O	
14648[@] *6*		11[k] keV *9*	L O	J^π: (4^{+}) in (^{16}O,α),(^{16}O,$\alpha\gamma$). 6^{+} in ^{20}Ne(α,α),(α,α').
14696[@] *1*	(5^{-})[&]	9[k] keV *1*	OP	J^π: L=3 in (α,α),(α,α').
14745[@] *10*	(4^{+})[b]	13[k] keV	L O	XREF: L(14740).
≈14793			I	
14928[@] *10*	$(0^{+},1^{-})$[b]	≈10[k] keV	L O	XREF: L(14920).
14995 *10*	$(4^{+},5^{-})$[b]	≈20[k] keV	O	
15045 *35*	(6^{-})		UVW	T=1 XREF: V(15.1E3)W(15137). E(level),J^π: From (e,e') 1977Za02. Spin parity assignment based on form factor calculations.
≈15093			I	
15117[@] *10*	(4^{+})[b]	15[k] keV	O w	
15141[@] *10*	[h]	15[k] keV	J L O w	T=0 XREF: L(15150).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$ or Γ[j]	XREF	Comments
				J$^\pi$: 4$^+$ in (α,α),(α,α′), assigned in 1991Ab05, based on excitation function trend (visual); 6$^-$ in ^{24}Mg(p,p′) probably for a doublet at 15137 *22*; 7$^-$ in (^{16}O,α),(^{16}O,αγ) 15150 *20*; 9$^+$ in (^{14}N,d) at 15150 *15*. Appears to be more than one level.
15179 *3*	(4$^+$)[a]	57[k] keV *7*	O	
15214[@] *1*	(5$^-$)[a]	36[k] keV *3*	L Op W	XREF: L(15210)W(15200).
15233[@] *3*	(4$^+$)[a]	27[k] keV *6*	Op	
15266 *10*	(1$^-$,3$^-$)[a]	≈8[k] keV	O	
15330 *30*	0$^+$[i]		Z	
15354 *3*	(4$^+$)[a]	21[k] keV *4*	O	
15385[@] *3*	(4$^+$)[a]	31[k] keV *7*	O VW	XREF: W(15370).
15437.5[‡] *6*	0$^+$	0.7 keV *3*	QR W	T=2 J$^\pi$: In 1978Mc07, (p,p$_0$) and (p,α$_0$) via l=2 in ^{23}Na(p,p) and l=0 in ^{23}Na(p,α). T$_{1/2}$ or Γ: unweighted average of 1.02 keV *34* from (p,γ) and 0.345 keV *50* from (p,p′).
15443 *10*	(2$^+$)[b]	13[k] keV	O	
15484[@] *10*	(2$^+$)[b]	15[k] keV	I O	XREF: I(15473).
15533[@] *1*	(6$^+$)[a]	18[k] keV *2*	L OP W	XREF: L(15540)W(15540). T$_{1/2}$ or Γ: Other: < 15 keV ((^{16}O,α) – 1984Le21).
15570 *15*			J	
15611 *3*	(2$^+$)[a]	31[k] keV *8*	O	
15640 *20*	(6$^+$)[f]		L	
15691 *10*	(0$^+$)[b]	≤15[k] keV	O	
15716 *10*	(4$^+$)[b]		O	
15750 *15*	[7$^-$,8$^+$][h]		J	
15790 *30*	0$^+$[i]		Z	
15793 *10*	(4$^+$)[b]	13[k] keV	L O	XREF: L(15800). J$^\pi$: L=2 in (α,α),(α,α′).
15828 *10*		87[k] keV	O	
15853 *10*		<13[k] keV	O	
15886 *10*	(4$^+$)[b]	42[k] keV	O	
15978	(1$^-$,3$^-$)[b]	≈35[k] keV	O	J$^\pi$: L=1 in (α,α),(α,α′).
16070[#] *20*	6$^+$[f]		L P	T=0
16136 *10*	(3$^-$)[b]	19 keV *6*	L O	XREF: L(16.15E3). T$_{1/2}$ or Γ: From ^{16}O,α) 1984Le21. Other: 29 keV (α,α),(α,α′).
16170 *10*	(4$^+$,6$^+$)[b]	<8[k] keV	O	J$^\pi$: L=4 in (α,α),(α,α′).
16203[@] *10*	(6$^+$)[a]	8[k] keV	L OP	
16278 *10*	(4$^+$)[a]	30[k] keV	O	
16309 *10*		10[k] keV	L O	T=0 E(level): From (α,α),(α,α′).
16333	(4$^+$,6$^+$)[b]		O	J$^\pi$: L=4 in (α,α),(α,α′).
16343 *10*	(4$^+$)[b]	13[k] keV	O	
16395 *4*	(2$^+$)[a]	37[k] keV *10*	O	

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
16440 *10*	(7^-)[b]	10[k] keV	l O	
16477[@] *1*	(6^+)[b]	8[k] keV *2*	l OP	J^π: L=4 in (α,α),(α,α′).
16529[@] *2*	(6^+)[b]	31[k] keV	Op	J^π: L=4 in (α,α),(α,α′).
16564 *10*	8^+[fh]		J L Op	T=0 E(level): From (α,α),(α,α′). J^π: Other: [10^+] in (^{14}N,d).
16602 *10*	6^+[f]	30[k] keV	L O	T=0 XREF: L(16590). E(level): Weighted average of 16605 *10* (α,α),(α,α′) and 16590 *20* (^{16}O,α),(^{16}O,αγ). Uncertainty is the lowest input value.
16611 *10*	(5^-)[b]	≤8[k] keV	O	
16674 *10*	6^+[f]	30[k] keV	L O	E(level): From (α,α),(α,α′).
16782 *10*	$(4^+,6^+)$[b]	30[k] keV	L O	XREF: L(16.80E3). $T_{1/2}$ or Γ: < 15 keV (^{16}O,α) (1984Le21).
16844 *10*	(6^+)[b]	22[k] keV	L O	E(level): From (α,α),(α,α′).
16874[@] *6*	(5^-)[a]	73[k] keV *17*	J OP	
16904 *3*		<7[n] fs	L	T=0
16929[@] *3*	(6^+)[a]	44[k] keV *6*	L O	
17017[@] *3*	(7^-)[a]	15[k] keV *10*	L OP	XREF: P(16.98E3).
17088[@] *3*	(6^+)[a]	44[k] keV *6*	OP	XREF: P(17.06E3).
17140 *2*	(5^-)[a]	26[k] keV *6*	L O	XREF: L(17.12E3).
17190 *15*	8^+[f]		J L	
17227 *2*	(4^+)[a]	17[k] keV *3*	O	
17.29×10^3[#] *4*		≈46[k] keV	L O	
17407 *10*	(6^+)[b]	20[k] keV	O	
17444 *10*	(6^+)[b]	20[k] keV	L O	E(level): From (α,α),(α,α′). J^π: Other: $(6^+,7^-)$ in (^{16}O,α),(^{16}O,αγ).
17465 *10*			O	
17520 *15*			J L	E(level): From (^{14}N,d).
17623 *3*	(5^-)[a]	23[k] keV *8*	L O	XREF: L(17.59E3).
17740 *10*	(4^+)[b]	≈25[k] keV	O	
17748 *10*		≈20[k] keV	O	
17782 *10*		≈42[k] keV	O	
17840 *10*		≈42[k] keV	O	
17.90×10^3	(8^+)		L	
17948 *3*	(4^+)[b]	56[k] keV *8*	O	
17990 *10*	(6^+)[b]	≈17[k] keV	O	
18038 *3*	(5^-)[a]	50[k] keV *8*	O	
18075 *10*			O	
18097 *10*		20[k] keV	O	
18157 *10*	(5^-)[b]	20[k] keV	O	
18.16×10^3[#]	8^+[f]		L	
18169 *10*	(7^-)[b]	<8[k] keV	O	E(level): From (α,α),(α,α′).
18203 *10*		≈25[k] keV	O	
18273 *10*	(7^-)[b]	≈21[k] keV	O	

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[j]	XREF	Comments
18332 *10*		≈17[k] keV	L O	XREF: Others: AC E(level): From (α,α),(α,α′).
18423 *10*	(6^+)[b]	≈17[k] keV	O	
18465 *10*		≈13[k] keV	O	
18740 *15*			J L	XREF: L(18.70E3). E(level): From (^{14}N,d).
18.97×10^3	(8^+)[f]		L	
19.0×10^3 *3*			L	
19110 *15*	(10^+)		J L	XREF: L(19.07E3). E(level): From (^{14}N,d). Other: (19.2 *1*) × 10^3 (2001Wi18 – (^{16}O,α),(^{16}O,αγ)). From measured Eα, 2001Wi18 report the excited level energy of 19139 keV *5* and note that for particle channel an uncertainty of 100 keV was expected with a possibility of doublet. J^π: From 2012Di04, based on αγγ angular correlations in (^{16}O,α),(^{16}O,αγ). γ-α branching ratio 0.0007 *3* (2001Wi18).
19.2×10^3 *3*			L	
19.21×10^3 *4*	(9^-)[f]		L	
19400 *15*			J	
19.69×10^3 *3*			L	
19890 *15*			J L	XREF: L(19.92E3).
19990 *15*	(7^-)[f]	59[n] keV *5*	J L	XREF: L(19.98E3).
20.03×10^3 *3*		28[n] keV *5*	L	
20.09×10^3	(9^-)[f]	35[n] keV *13*	L	
20210 *15*	$[10^+]$[h]	35[n] keV *13*	J L	XREF: L(20.17E3).
20260 *15*	(8^+)[f]	64[n] keV *8*	J L	XREF: L(20.24E3).
20.28×10^3[#] *2*	(2^+)[g]		LM	
20.42×10^3	(9^-)[f]		L	
20.46×10^3 *1*		<15[n] keV	L	
20.53×10^3 *3*	(6^+)[f]	43[n] keV *13*	L	
20.68×10^3[#] *5*			LM	
20.83×10^3 *3*		<15[n] keV	L	
20.91×10^3 *3*		<15[n] keV	L	
20.94×10^3 *3*			L	
21.20×10^3[#] *2*	(4^+)[g]		LM	
21.29×10^3 *3*		<15[n] keV	L	
21.39×10^3 *2*	(6^+)[f]		L	
21.46×10^3 *2*			L	
21.66×10^3[#] *5*			Lm	
21.80×10^3[#] *1*		<15[n] keV	Lm	
22.3×10^3 *2*	(4^+)[g]		M	
22.4×10^3 *2*	(8)[g]		M	
22.79×10^3 *2*			L	
22.87×10^3 *1*		<15[n] keV	L	
22.93×10^3 *3*		73[n] keV *13*	L	
23.00×10^3 *2*			L	
23.10×10^3 *3*			L	

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

E(level)[†]	J$^{\pi}$	$T_{1/2}$ or Γ[j]	XREF	Comments
23.19×10^{3} *3*		<15[n] keV	L	
23.26×10^{3} *1*		<15[n] keV	L	
23.77×10^{3}[#] *1*	(6^{+},(8^{+}))[g]		LM	
24.37×10^{3} *3*	(9)[g]	27[n] keV *3*	LM	
24.53×10^{3}[#] *5*			L	
24.60×10^{3}[#] *3*	(8^{+})[g]		LM	
24.98×10^{3}[#] *14*	(9)[g]		LM	
25.18×10^{3} *3*	(6^{+})[g]	163[n] keV *6*	LM	XREF: M(25.1E3).
25.40×10^{3} *3*			L	
25.8×10^{3} *2*	(9,10)[g]		lM	
26.2×10^{3} *2*	(10)[g]		lM	
26.28×10^{3} *2*	(12^{+})[f]		L	
26.45×10^{3} *3*	(8^{+})[g]	115[n] keV *20*	LM	XREF: M(26.4E3).
26.67×10^{3} *3*	(12^{+})[f]		L	
26.8×10^{3} *2*	(10)[g]		M	
27.4×10^{3}[#] *1*			LM	
28.0×10^{3}[#] *1*	(10)[g]		LM	XREF: M(27.8E3).
28.5×10^{3}[#] *1*			L	
29.3×10^{3}[#] *1*	(10,12)[g]		LM	XREF: M(29.1E3).
29.7×10^{3}[#] *1*			L	
30.1×10^{3}[#] *1*	(12)[g]		LM	XREF: M(30.3E3).
31.2×10^{3}[#] *1*	(12)[g]		LM	
31.8×10^{3}[#] *1*			L	
32.6×10^{3}[#] *1*	(10)[g]		LM	XREF: M(32.7E3).
33.1×10^{3}[#] *1*			L	
37.5×10^{3}			M	
43.0×10^{3}			M	
46.4×10^{3}	(14^{+},16^{+})[g]		M	

† From a least squares fit to the measured γ-ray energies for levels with depopulating γ, assuming ΔE=1 keV where not given, unless where otherwise noted. Calculated Eγ were not considered in the least squares fit.
‡ From (p,γ).
# From (^{16}O,α),(^{16}O,αγ).
@ From (α,α),(α,α′):Resonance.
& From (α,α),(α,α′), based on measured σ(θ) and Legendre polynomial fits (1954Go70).
a From (α,α),(α,α′), based on fit of measured σ(θ) data (1991Ab05 or 1992Da10).
b From (α,α),(α,α′), assigned in 1991Ab05, based on excitation function trend (visual).
c From αγ angular correlations (1983Sc17,1965Sm03) (α,γ).
d From 1956Ba96 – ^{23}Na(p,p), based on either of the elastic scattering (p_0) or capture γ(θ) measurements.
e From 1987Va24 – ^{23}Na(p,p), based on the elastic and inelastic scattering through allowed channels for resonances in ^{24}Mg or capture γ(θ) measurements.
f From 2012Di04 – (^{16}O,α),(^{16}O,αγ), based on αγγ angular correlations, the γ cascade is 2614γ – 1633γ in ^{20}Ne, or based on αα angular correlations.
g From ^{12}C(^{24}Mg,2^{12}C),(^{20}Ne,2^{12}C) based on measured and projected angular correlation measurement data of the decaying state in 2001Sh08 or 2001Fr03. The periodicity of the ridges is is described by a Legendre polynomial of order of the spin of the

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Adopted Levels, Gammas (continued)

^{24}Mg Levels (continued)

decaying state. Parity $(-1)^J$ for the decaying state of natural parity, if the recoiling particle has spin-zero.

[h] Used for Hauser-feshbach calculations to fit the measured differential cross section data in (^{14}N,d).

[i] From 2021Ad09 (^{24}Mg(α,α')) based on comparison of differential cross sections to DWBA calculations.

[j] From (p,γ),(p,p′),(p,X) mainly by DSA method, except where otherwise noted.

[k] From (α,α),(α,α'), from resonance fits.

[l] From (p,p′),(pol p,p′),(pol p,p′γ), by DSA method.

[m] From (e,e′), from Γ_0 and adopted γ-ray branching.

[n] From (^{16}O,α),(^{16}O,$\alpha\gamma$), by DSA method.

[o] From (α,γ), by DSA method.

[p] Band(A): Prolate K^π=0^+ band.

[q] Band(B): Prolate K^π=2^+ band.

$\gamma(^{24}Mg)$

E_i(level)	J_i^π	E_γ	I_γ[b]	E_f	J_f^π	Mult.[d]	δ	α[e]	Comments
1368.667	2^+	1368.625 *5*	100	0	0^+	E2		5.62×10^{-5} *8*	B(E2)(W.u.)=21.07 *+48−46* $\alpha=5.62\times10^{-5}$ *8*; α(K)=9.29×10^{-6} *13*; α(L)=5.97×10^{-7} *9*; α(M)=2.21×10^{-8} *3* α(IPF)=4.63×10^{-5} *7* E_γ: From ^{24}Na β^- decay (14.956 h).
4122.853	4^+	2754.016 *11*	100	1368.667	2^+	E2		6.78×10^{-4}	B(E2)(W.u.)=35.7 *+34−29* α(K)=2.54×10^{-6} *4*; α(L)=1.632×10^{-7} *23*; α(M)=6.05×10^{-9} *9* α(IPF)=0.000675 *10* E_γ: Weighted average of 2754.007 *11* from ^{24}Na β^- decay (14.956 h), 2754.030 *14* from ^{24}Al ε decay (2.053 s). Other: 2751.8 *15* (^{3}He,dγ).
4238.35	2^+	2869.50 *6*	27.8 *8*	1368.667	2^+	M1+E2	−23 *9*	7.30×10^{-4}	B(M1)(W.u.)=8×10^{-6} *+15−4*; B(E2)(W.u.)=3.36 *27* α(K)=2.38×10^{-6} *4*; α(L)=1.528×10^{-7} *22*; α(M)=5.67×10^{-9} *8* α(IPF)=0.000727 *11* E_γ: From ^{24}Al ε decay (2.053 s). Others: 2871.0 *10* (^{24}Na β^- decay (14.956 h)) and 2869.3 *4* (^{24}Al ε decay (130.7 ms)). I_γ: weighted average of 30 *5* from ^{24}Na β^- decay (14.956 h), 30.5 *11* from ^{24}Al ε decay (2.053 s), 3E1 *3* from ^{24}Al ε decay (130.7 ms), 33 *3* from ^{25}Si β^+p decay, 24 *6* from (^{12}C,γ), 30 *3* from (α,γ), and 26.7 *6* from (p,γ). Mult.,δ: From 1960Ba19 (pol p,p′γ) and RUL − see (p,p′),(pol p,p′).
		4237.96[†] *6*	100.0 *6*	0	0^+	[E2]		1.25×10^{-3}	B(E2)(W.u.)=1.72 *+14−12* α(K)=1.330×10^{-6} *19*; α(L)=8.53×10^{-8} *12*; α(M)=3.16×10^{-9} *5* α(IPF)=0.001253 *18* E_γ: From ^{24}Al ε decay (2.053 s). I_γ: From (p,γ).
5235.16	3^+	996.83[†] *10*	2.63[†] *14*	4238.35	2^+	D+Q			Mult.,δ: +5.1 *+12−8* and +0.47 *4* (1973Le15 − (p,γ)).
		3866.15 *10*	100.0[†] *5*	1368.667	2^+	E2(+M1)	−17 *4*	1.12×10^{-3}	B(M1)(W.u.)=1.7×10^{-5} *+12−6*; B(E2)(W.u.)=2.08 *16* α(K)=1.516×10^{-6} *22*; α(L)=9.73×10^{-8} *14*; α(M)=3.61×10^{-9} *5* α(IPF)=0.001122 *16* E_γ: Weighted average of 3866.14 *10* from ^{24}Al ε decay (2.053 s), and 3867.2 *14* from (^{3}He,dγ). Mult.,δ: From (pol p,p′γ) in 1973Gl01 and RUL.
		5235[a]	10 *3*	0	0^+	[M3]			I_γ: From (^{28}Si,Xγ). B(M3)(W.u.)=1.16×10^4 *33* exceeds RUL=10.
6010.34	4^+	775.4[†] *2*	1.6[†] *2*	5235.16	3^+				
		1771.92[†] *7*	11.4 *4*	4238.35	2^+	[E2]		2.11×10^{-4}	B(E2)(W.u.)=14.9 *12* α(K)=5.50×10^{-6} *8*; α(L)=3.53×10^{-7} *5*; α(M)=1.310×10^{-8} *19*

From ENSDF

Adopted Levels, Gammas (continued)

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	α[e]	Comments
								α(IPF)=0.000205 *3* I_γ: weighted average of 11.70 *29* from ^{24}Al ε decay (2.053 s), 7.5 *32* from (α,γ), and 10.5 *5* from (p,γ). Other: 15 *4* (^{28}Si,Xγ).
6010.34	4^+	1887.52[†] *20*	1.64[†] *18*	4122.853	4^+			
		4641.19[†] *9*	100.0 *5*	1368.667	2^+	[E2]	1.38×10^{-3}	B(E2)(W.u.)=1.06 *8* α(K)=1.172×10^{-6} *17*; α(L)=7.52×10^{-8} *11*; α(M)=2.79×10^{-9} *4* α(IPF)=0.001381 *20* E_γ: Other: 4636.4 *16* (^{3}He,dγ). I_γ: Weighted average of 100.0 *32* from (α,γ) and 100.0 *5* from (p,γ). Other: 100 *7* from ^{24}Al ε decay (2.053 s). Branching to g.s. could, in principle, be deduced from B(E4) ((e,e′), 1978Za07) and level lifetime.
6432.2	0^+	2194[a]	21.0 *9*	4238.35	2^+	[E2]	4.13×10^{-4}	B(E2)(W.u.)=6.8 *+15−11* α(K)=3.72×10^{-6} *6*; α(L)=2.39×10^{-7} *4*; α(M)=8.86×10^{-9} *13* α(IPF)=0.000409 *6* I_γ: Weighted average of 25 *13* from (α,γ), 21.1 *9* from (p,γ), and 20 *3* ^{24}Mg(pol p,p′γ).
		5063.2[‡‡]	100.0 *9*	1368.667	2^+	[E2]	1.51×10^{-3}	B(E2)(W.u.)=0.50 *+10−7* α(K)=1.040×10^{-6} *15*; α(L)=6.68×10^{-8} *10*; α(M)=2.48×10^{-9} *4* α(IPF)=0.001505 *21*
		6432		0	0^+	E0	8.76×10^{-3}	E_γ: From level energy difference. Mult.,α: From pair-conversion electron intensity measurements (2020Do10 – (p,p′γ)). α – estimated by the evaluators using q^2_π(E0/E2)=5.8 *8* (2020Do10) and α(5063γ – E2)=0.00151. q^2_π(E0/E2)=5.8 *8* – the ratio of the pair-conversion electron intensity (2020Do10 – (p,p′γ)). X(E0/E2)=27 *4* – absolute transition rate B(E0)/B(E2) (2020Do10 – (p,p′γ)). ρ^2(E0)=0.380 *70* – E0 transition strength (2020Do10 – (p,p′γ)).
7348.60	2^+	5979.5[†] *8*	61 *3*	1368.667	2^+			
		7347.2[†] *9*	100 *3*	0	0^+	[E2]		B(E2)(W.u.)=0.61 *+31−15*
7555.3	1^-	3316.7[a]	49 *4*	4238.35	2^+	[E1]	1.39×10^{-3}	B(E1)(W.u.)=1.9×10^{-5} *+5−4* α(K)=1.369×10^{-6} *20*; α(L)=8.79×10^{-8} *13*; α(M)=3.26×10^{-9} *5* α(IPF)=0.001393 *20*
		6185.8[a]	64 *4*	1368.667	2^+	[E1]		B(E1)(W.u.)=3.8×10^{-6} *+10−7*
		7554.0[‡]	100 *6*	0	0^+	[E1]		B(E1)(W.u.)=3.3×10^{-6} *+9−6*
7616.41	3^-	2381.0[†] *3*	7[†] *2*	5235.16	3^+	[E1]		B(E1)(W.u.)=2.6×10^{-6} *+9−8*
		3378.3[†] *8*	8.0[†] *13*	4238.35	2^+	[E1]	1.42×10^{-3}	B(E1)(W.u.)=1.04×10^{-6} *+25−21* α(K)=1.339×10^{-6} *19*; α(L)=8.59×10^{-8} *12*; α(M)=3.18×10^{-9} *5* α(IPF)=0.001420 *20*
		3493.3[a]	7.2 *14*	4122.853	4^+	[E1]	1.47×10^{-3}	B(E1)(W.u.)=8.5×10^{-7} *+22−19* α(K)=1.285×10^{-6} *18*; α(L)=8.24×10^{-8} *12*; α(M)=3.06×10^{-9} *5*

$^{24}_{12}Mg_{12}$-20

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	α[e]	Comments
								α(IPF)=0.001473 *21* I_γ: weighted average of 7.4 *19* from ^{24}Al ε decay (2.053 s), 9 *4* from (α,γ), and 6.9 *14* from (p,γ).
7616.41	3^-	6246.89[†] *11*	100 *3*	1368.667	2^+	[E1]		B(E1)(W.u.)=2.06×10^{-6} *+37−28*
		7615.2[†] *9*	38 *3*	0	0^+	[E3]		B(E3)(W.u.)=5.6 *+11−8* I_γ: Unweighted average of 41.5 *28* from ^{24}Al ε decay (2.053 s), 41.4 *86* from (α,γ), and 31.9 *28* from (p,γ).
7747.7	1^+	3509.1[a]	12.9 *9*	4238.35	2^+			
		6378.1[a]	100 *3*	1368.667	2^+			
		7746.4[a]	39 *3*	0	0^+			
7812.4	$(4^-,5^+)$	1800[#]	12 *3*	6010.34	4^+			
		2577.4[†] *8*	100[c] *5*	5235.16	3^+			E_γ: Other: 2580 (^{16}O,α),(^{16}O,$\alpha\gamma$).
		3690[#]	51 *7*	4122.853	4^+			I_γ: Weighted average of 59 *9* from (^{16}O,α), 32 *9* from (α,γ), and 55 *5* from (p,γ).
8113.2	6^+	3990.0[‡]	100	4122.853	4^+	[E2]	1.17×10^{-3}	B(E2)(W.u.)=38 *+18−10* α(K)=1.449×10^{-6} *21*; α(L)=9.30×10^{-8} *13*; α(M)=3.45×10^{-9} *5* α(IPF)=0.001166 *17*
8358.1	3^-	2347.7[a]	22 *4*	6010.34	4^+	[E1]	8.77×10^{-4}	B(E1)(W.u.)=1.34×10^{-4} *+30−27* α(K)=2.14×10^{-6} *3*; α(L)=1.375×10^{-7} *20*; α(M)=5.10×10^{-9} *8* α(IPF)=0.000875 *13* I_γ: From (p,γ). Others: 13 *11* (α,γ), 52 *10* from (^{12}C,γ).
		3122.7[a]	33 *4*	5235.16	3^+	[E1]		B(E1)(W.u.)=8.6×10^{-5} *+16−13* I_γ: From (p,γ). Others: 35 *11* (α,γ), 75 *17* from (^{12}C,γ).
		6988.3[‡]	100 *7*	1368.667	2^+	[E1]		B(E1)(W.u.)=2.31×10^{-5} *+35−28* I_γ: weighted average of 100 *7* from (^{12}C,γ), 100 *11* from (α,γ), and 100 *8* from (p,γ).
		8356.5[a]	8.6 *10*	0	0^+	[E3]		B(E3)(W.u.)=10.4 *+20−17* I_γ: deduced from B(E3) in (e,e′) (1974Jo10) and adopted level half-life.
8438.4	1^-	7068.6[a]	25 *13*	1368.667	2^+	[E1]		B(E1)(W.u.)=5.1×10^{-5} *+28−22*
		8436.8[‡]	100 *13*	0	0^+	(E1)		B(E1)(W.u.)=1.20×10^{-4} *+37−24* Mult.: D from $\gamma(\theta)$ (1969Ca18 − ($\alpha,\alpha'\gamma$) and $\Delta\pi$=yes from levels scheme.
8439.29	4^+	822.0[†] *6*	0.05[†] *2*	7616.41	3^-	[E1]		B(E1)(W.u.)=0.00015 *+13−7*
		1090.67[†] *10*	0.32[†] *2*	7348.60	2^+	[E2]		B(E2)(W.u.)=59 *+43−19* B(E2)(W.u.)=59 *+43−19* upper bound exceeds RUL=100.
		2428.97[†] *15*	1.79[†] *4*	6010.34	4^+			
		3203.88[†] *8*	7.21 *16*	5235.16	3^+			I_γ: Weighted average of 7.13 *16* from ^{24}Al ε decay (2.053 s) and 7.49 *31* from (p,γ).
		4200.54[†] *13*	9.5 *5*	4238.35	2^+	[E2]	1.24×10^{-3}	B(E2)(W.u.)=2.1 *+15−6* α(K)=1.347×10^{-6} *19*; α(L)=8.64×10^{-8} *12*; α(M)=3.20×10^{-9} *5*

$^{24}_{12}Mg_{12}$-21

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^{π}_i	E_γ	I_γ[b]	E_f	J^{π}_f	Mult.[d]	α[e]	Comments
								α(IPF)=0.001239 *18* I_γ: Weighted average of 9.3 *5* from ^{24}Al ε decay (2.053 s) and 9.7 *5* from (p,γ).
8439.29	4^+	4316.00[†] *12*	33 *3*	4122.853	4^+			I_γ: Weighted average of 30.8 *14* from ^{24}Al ε decay (2.053 s) and 36.7 *16* from (p,γ).
		7069.50[†] *12*	100.0 *17*	1368.667	2^+	[E2]		B(E2)(W.u.)=1.6 *+12−5*
8654.9	2^+	2222.3[a]	6.1 *12*	6432.2	0^+	[E2]	4.27×10^{-4}	B(E2)(W.u.)=9.0 *+32−22* α(K)=3.64×10^{-6} *5*; α(L)=2.34×10^{-7} *4*; α(M)=8.66×10^{-9} *13* α(IPF)=0.000423 *6*
		4416.1[a]	17 *3*	4238.35	2^+			I_γ: weighted average of 26 *7* from (α,γ) and 15.9 *25* from (p,γ).
		7285.0[a]	100.0 *25*	1368.667	2^+			
8864.5	2^-	3629.0[a]	2.17 *16*	5235.16	3^+	[E1]	1.53×10^{-3}	B(E1)(W.u.)=6.0×10^{-5} *+36−17* α(K)=1.226×10^{-6} *18*; α(L)=7.87×10^{-8} *11*; α(M)=2.92×10^{-9} *4* α(IPF)=0.001533 *22*
		4625.7[a]	8.9 *3*	4238.35	2^+	[E1]		B(E1)(W.u.)=1.2×10^{-4} *+7−3*
		7494.6[a]	100.0 *3*	1368.667	2^+	[E1]		B(E1)(W.u.)=0.00031 *+19−9*
		8862.7[a]	1.03 *16*	0	0^+	[M2]		B(M2)(W.u.)=0.11 *+7−4*
9003.5	2^+	1654.4[a]	12 *4*	7348.60	2^+			
		2570.9[a]	14 *6*	6432.2	0^+	[E2]	5.94×10^{-4}	B(E2)(W.u.)=13 *+6−5* α(K)=2.84×10^{-6} *4*; α(L)=1.83×10^{-7} *3*; α(M)=6.77×10^{-9} *10* α(IPF)=0.000591 *9*
		4880.1[a]	35 *10*	4122.853	4^+	[E2]	1.46×10^{-3}	B(E2)(W.u.)=1.29 *+39−34* α(K)=1.094×10^{-6} *16*; α(L)=7.02×10^{-8} *10*; α(M)=2.60×10^{-9} *4* α(IPF)=0.001454 *21*
		9001.7[a]	100 *12*	0	0^+	[E2]		B(E2)(W.u.)=0.172 *+34−26*
9146.2	1^-	4907.3[a]	53 *4*	4238.35	2^+			
		7776.2[a]	60 *4*	1368.667	2^+			
		9144.3[a]	100 *6*	0	0^+			
9284.4	2^+,4^+	5161	27 *4*	4122.853	4^+			E_γ: From (^{12}C,γ). I_γ: Weighted average of 18 *6* from (α,γ), and 28.2 *26* from (p,γ). Other: 60 *10* from (^{12}C,γ).
		7914.3[‡]	100 *3*	1368.667	2^+			
9299.8		1683.3[‡]	100	7616.41	3^-			
9301.07	(4^+)	1952.38[†] *20*	7.3[†] *5*	7348.60	2^+			
		5060.7[†] *8*	2.8[†] *10*	4238.35	2^+			
		5177.51[†] *20*	76[†] *8*	4122.853	4^+			
		7930.87[†] *15*	100[†] *8*	1368.667	2^+			
9305.39	0^+	7935.3[a]	100	1368.667	2^+			
9457.81	$(3)^+$	1710.0[a]	2.1 *9*	7747.7	1^+			
		2108.65[a]	1.5 *5*	7348.60	2^+			
		3447.21[a]	2.1 *3*	6010.34	4^+			

$^{24}_{12}Mg_{12}$-22

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^{π}_i	E_γ	I_γ[b]	E_f	J^{π}_f	Mult.[d]	α[e]	Comments
9457.81	(3)$^+$	4222.20[a]	12.0 *8*	5235.16	3$^+$			
		5218.81[a]	5.6 *6*	4238.35	2$^+$			
		5334.29[a]	28.4 *9*	4122.853	4$^+$			
		8087.66[a]	100.0 *17*	1368.667	2$^+$			
9516.18	4$^+$	1076.86[†] *4*	85.8[†] *17*	8439.29	4$^+$			
		1704.8[†] *8*	0.09[†] *2*	7812.4	(4$^-$,5$^+$)			
		1899.70[†] *6*	4.74[†] *12*	7616.41	3$^-$	[E1]	5.75×10^{-4}	B(E1)(W.u.)=0.00023 *+15−7* α(K)=2.89×10^{-6} *4*; α(L)=1.85×10^{-7} *3*; α(M)=6.87×10^{-9} *10* α(IPF)=0.000572 *8*
		3505.61[†] *9*	11.5[†] *4*	6010.34	4$^+$			
		4280.62[†] *13*	3.82[†] *23*	5235.16	3$^+$			I_γ: Other: 7.6 *8* in (p,γ).
		5277.2[a]	2.0 *10*	4238.35	2$^+$			
		5392.68[†] *9*	100 *6*	4122.853	4$^+$			
		8146.0[a]	0.16[†] *4*	1368.667	2$^+$	[E2]		B(E2)(W.u.)=0.00025 *+18−9*
9527.6	(6$^+$)	3517.0[‡]	100[#] *6*	6010.34	4$^+$	[E2]	1.00×10^{-3}	B(E2)(W.u.)=25 *+22−9* α(K)=1.742×10^{-6} *25*; α(L)=1.118×10^{-7} *16*; α(M)=4.15×10^{-9} *6* α(IPF)=0.000999 *14*
		5404.0[‡]	28[#] *6*	4122.853	4$^+$	[E2]	1.60×10^{-3}	B(E2)(W.u.)=0.8 *+7−3* α(K)=9.53×10^{-7} *14*; α(L)=6.12×10^{-8} *9*; α(M)=2.27×10^{-9} *4* α(IPF)=0.001601 *23*
9532.7	(2,3)$^+$	1916.0[a]	7.4 *10*	7616.41	3$^-$			
		4297.1[a]	39 *6*	5235.16	3$^+$			
		5293.7[a]	84 *6*	4238.35	2$^+$			
		8162.5[a]	100 *26*	1368.667	2$^+$			
9828.0	1$^+$	3395.2[a]	2.1 *5*	6432.2	0$^+$			
		8457.7[a]	30.3 *20*	1368.667	2$^+$			
		9825.9[&] *20*	100.0 *19*	0	0$^+$			
9965.3	1$^+$	8595.1[&] *15*	38[&] *6*	1368.667	2$^+$			
		9963.0[&] *15*	100[&] *12*	0	0$^+$			
10027.97	5$^-$	1670[@]	45.4 *22*	8358.1	3$^-$	[E2]	1.66×10^{-4}	B(E2)(W.u.)=32 *+14−8* α(K)=6.17×10^{-6} *9*; α(L)=3.96×10^{-7} *6*; α(M)=1.469×10^{-8} *21* α(IPF)=0.0001595 *23*
		2215.6[a]	7.3 *12*	7812.4	(4$^-$,5$^+$)			
		2411.2[a]	8.8 *24*	7616.41	3$^-$	[E2]	5.19×10^{-4}	B(E2)(W.u.)=1.0 *+5−3* α(K)=3.17×10^{-6} *5*; α(L)=2.03×10^{-7} *3*; α(M)=7.53×10^{-9} *11* α(IPF)=0.000515 *8*
		4017.2[a]	23 *3*	6010.34	4$^+$	[E1]	1.69×10^{-3}	B(E1)(W.u.)=1.9×10^{-5} *+9−5* α(K)=1.085×10^{-6} *16*; α(L)=6.96×10^{-8} *10*; α(M)=2.58×10^{-9} *4* α(IPF)=0.001687 *24*

$^{24}_{12}Mg_{12}$-23

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	α[e]	Comments
10027.97	5^-	5904.2[‡]	100 *10*	4122.853	4^+	[E1]	0.00227	B(E1)(W.u.)=2.6×10^{-5} +*11*−*6* α(K)=6.95×10^{-7} *10*; α(L)=4.46×10^{-8} *7*; α(M)=1.652×10^{-9} *24* α(IPF)=0.00227 *4*
		8657.5[a]	61 *12*	1368.667	2^+	[E3]		B(E3)(W.u.)=39 +*18*−*11*
10059.1	$(1,2)^+$	5820.0[a]	16 *4*	4238.35	2^+			
		8688.6[&] *25*	100 *4*	1368.667	2^+			
10110.9	(0^+)	8740.5[a]	100	1368.667	2^+			
10333.6	3^-	6094.4[a]	61 *11*	4238.35	2^+			
		8963[@]	100 *11*	1368.667	2^+			
10360.7	2^+	3927.9[a]	1.2 *4*	6432.2	0^+	[E2]	1.15×10^{-3}	B(E2)(W.u.)=1.0 +*6*−*4* α(K)=1.482×10^{-6} *21*; α(L)=9.51×10^{-8} *14*; α(M)=3.53×10^{-9} *5* α(IPF)=0.001144 *16*
		5124.9[a]	3.0 *7*	5235.16	3^+			
		8990.2[‡]	100 *4*	1368.667	2^+			
		10358.3[a]	72 *4*	0	0^+	[E2]		B(E2)(W.u.)=0.47 +*20*−*11*
10575.93	$(4)^+$	1059.78[†] *8*	100[†] *6*	9516.18	4^+			
		1274.71[†] *10*	37.2[†] *21*	9301.07	(4^+)			
		2136.58[†] *15*	59[†] *3*	8439.29	4^+			
		5340.3[†] *4*	40[†] *5*	5235.16	3^+			
10581.26	$(2^+,3^+,4^+)$	4570.4[a]	20.6 *8*	6010.34	4^+			
		5345.4[a]	53.4 *15*	5235.16	3^+			
		6342.0[a]	100 *3*	4238.35	2^+			
		6457.4[a]	37.6 *13*	4122.853	4^+			
		9210.6[a]	46.1 *15*	1368.667	2^+			
10659.8	$(1,2^+)$	9289.2[a]	43 *11*	1368.667	2^+			
		10657.3[a]	100 *11*	0	0^+			
10660.17	$(3^+,4^+)$	5424.2[a]	12 *3*	5235.16	3^+			
		6536.3[a]	35 *13*	4122.853	4^+			
		9289.5[a]	100 *13*	1368.667	2^+			
10679.7	0^+	3124[a]	0.6[c] *4*	7555.3	1^-			
		3331[a]	2.4[c] *4*	7348.60	2^+			
		6440[a]	14.7[c] *12*	4238.35	2^+			
		9309[a]	100[c] *3*	1368.667	2^+			
10712.2	1^+	10709.6[a]	100	0	0^+			
10731.1	2^+	5495.2[a]	10 *3*	5235.16	3^+			
		6491.8[a]	27 *3*	4238.35	2^+	(M1)		B(M1)(W.u.)=0.0023 +*16*−*7* Mult.: D from (γ,θ) in (α,γ); $\Delta\pi$=yes from level scheme.
		9360.5[a]	100 *4*	1368.667	2^+			
10820.8	$3^+,4^+$	9450.1[†] *4*	100	1368.667	2^+			
10917.2	2^+	4485[a]	0.85[c] *21*	6432.2	0^+	[E2]	1.34×10^{-3}	B(E2)(W.u.)=0.38 +*11*−*10*

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	α[e]	Comments
								α(K)=1.229×10^{-6} *18*; α(L)=7.88×10^{-8} *11*; α(M)=2.92×10^{-9} *4* α(IPF)=0.001337 *19*
10917.2	2^+	4906.3[a]	1.70[c] *21*	6010.34	4^+	[E2]	1.46×10^{-3}	B(E2)(W.u.)=0.48 *+10−8* α(K)=1.086×10^{-6} *16*; α(L)=6.97×10^{-8} *10*; α(M)=2.58×10^{-9} *4* α(IPF)=0.001462 *21*
		5681.3[a]	2.77[c] *21*	5235.16	3^+			
		6677.8[a]	1.06[c] *21*	4238.35	2^+			
		6793.3[a]	34.0[c] *21*	4122.853	4^+	[E2]		B(E2)(W.u.)=1.90 *+29−24*
		9546.5[a]	100[c] *4*	1368.667	2^+			
		10914.5[a]	72[c] *4*	0	0^+	[E2]		B(E2)(W.u.)=0.38 *+6−5*
11012	$3,5^+$	2573[a]	100 *11*	8439.29	4^+			
		5001[a]	47 *9*	6010.34	4^+			
11018	2^+	1048[a]	2.5[c] *6*	9965.3	1^+			
		3270[a]	0.62[c] *12*	7747.7	1^+			
		3462[a]	0.37[c] *12*	7555.3	1^-			
		5007[a]	0.86[c] *12*	6010.34	4^+			
		5782[a]	1.5[c] *3*	5235.16	3^+			
		6779[a]	2.4[c] *4*	4238.35	2^+			
		6894[a]	1.0[c] *3*	4122.853	4^+			
		9647[a]	100[c] *3*	1368.667	2^+			
		11015[a]	14.2[c] *12*	0	0^+			
11133		3518	100	7616.41	3^-			E_γ: From (α,γ).
11165	3^-	2726[a]	5.8[c] *3*	8438.4	1^-			
		3609[a]	6.2[c] *3*	7555.3	1^-			
		5154[a]	13.1[c] *3*	6010.34	4^+			
		5929[a]	11.3[c] *3*	5235.16	3^+			
		7041[a]	1.81[c] *14*	4122.853	4^+			
		9794[a]	100[c] *3*	1368.667	2^+			
11187.3		9816.5[‡]	100	1368.667	2^+			
11207		9836[a]	100	1368.667	2^+			
11216.69	$3^+,4^+$	1700[a]	1.40[c] *12*	9516.18	4^+			
		2562[a]	0.81[c] *12*	8654.9	2^+			
		3868[a]	0.35[c] *12*	7348.60	2^+			
		5981[a]	0.93[c] *12*	5235.16	3^+			
		7093[a]	12.8[c] *12*	4122.853	4^+			
		9846[a]	100.0[c] *23*	1368.667	2^+			
11314.4	$(3,4)^+$	9943.5[†] *15*	100	1368.667	2^+			
11330		9959[a]	100	1368.667	2^+			
11391	1^-	1332[a]	1.9[c] *3*	10059.1	$(1,2)^+$			
		1426[a]	1.01[c] *14*	9965.3	1^+			

$^{24}_{12}Mg_{12}$-25

γ(^{24}Mg) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$	I$_\gamma$[b]	E$_f$	J$^\pi_f$	Mult.[d]	α[e]	Comments
11391	1$^-$	2953[a]	1.01[c] *14*	8438.4	1$^-$			
		3643[a]	1.45[c] *14*	7747.7	1$^+$			
		4958[a]	1.16[c] *14*	6432.2	0$^+$			
		7152[a]	2.2[c] *3*	4238.35	2$^+$			
		10020[a]	100[c] *3*	1368.667	2$^+$			
		11388[a]	36.2[c] *14*	0	0$^+$			
11452.8	2$^+$	721.7[a]	3.4[c] *5*	10731.1	2$^+$			
		1393.7[a]	1.14[c] *23*	10059.1	(1,2)$^+$			
		1487.5[a]	12.7[c] *7*	9965.3	1$^+$			
		3704.8[a]	3.2[c] *5*	7747.7	1$^+$			
		3836.0[a]	0.9[c] *5*	7616.41	3$^-$			
		4103.4[a]	1.36[c] *23*	7348.60	2$^+$			
		6216.7[a]	4.1[c] *5*	5235.16	3$^+$			
		7213.3[a]	47.7[c] *23*	4238.35	2$^+$			
		7328.7[a]	1.82[c] *23*	4122.853	4$^+$			
		10081.8[a]	100.0[c] *23*	1368.667	2$^+$			
		11449.8[a]	50.0[c] *23*	0	0$^+$			
11522	2$^+$	791[a]	1.59 *16*	10731.1	2$^+$			
		1463[a]	2.1 *3*	10059.1	(1,2)$^+$			
		1557[a]	1.11 *16*	9965.3	1$^+$			
		3164[a]	0.32 *16*	8358.1	3$^-$			
		3774[a]	1.11 *16*	7747.7	1$^+$			
		3905[a]	1.43 *16*	7616.41	3$^-$			
		5089[a]	12.2 *5*	6432.2	0$^+$			
		7282[a]	8.1 *3*	4238.35	2$^+$			
		7398[a]	7.0 *3*	4122.853	4$^+$			
		10151[a]	23.8 *16*	1368.667	2$^+$			
		11519[a]	100 *3*	0	0$^+$			
11600	3$^-$	2084[a]	21.8[c] *14*	9516.18	4$^+$	[E1]	7.05×10^{-4}	B(E1)(W.u.)=0.00057 *+21−13* α(K)=2.53×10^{-6} *4*; α(L)=1.622×10^{-7} *23*; α(M)=6.01×10^{-9} *9* α(IPF)=0.000702 *10*
		2299[a]	75[c] *5*	9301.07	(4$^+$)	[E1]		B(E1)(W.u.)=0.0015 *+5−3*
		2300[a]	5.9[c] *14*	9299.8				
		2315[a]	12.5[c] *11*	9284.4	2$^+$,4$^+$	[E1]		B(E1)(W.u.)=2.4×10^{-4} *+9−6*
		3242[a]	8.2[c] *7*	8358.1	3$^-$			
		3983[a]	100[c] *5*	7616.41	3$^-$			
		7476[a]	3.9[c] *5*	4122.853	4$^+$	[E1]		B(E1)(W.u.)=2.2×10^{-6} *+9−6*
11698.2	4$^+$	686[a]	1.82[c] *23*	11012	3,5$^+$			
		2397[a]	100[c] *5*	9301.07	(4$^+$)			
		2398[a]	1.1[c] *5*	9299.8				

Adopted Levels, Gammas (continued)

$\gamma(^{24}\mathrm{Mg})$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f
11698.2	4^+	3043[a]	2.5[c] *5*	8654.9	2^+
		3259[a]	3.6[c] *5*	8439.29	4^+
		3885[a]	1.4[c] *5*	7812.4	$(4^-,5^+)$
		4349[a]	5.9[c] *5*	7348.60	2^+
		5687[a]	5.0[c] *5*	6010.34	4^+
		6462[a]	6.8[c] *5*	5235.16	3^+
		7459[a]	19.8[c] *9*	4238.35	2^+
		7574[a]	15.7[c] *9*	4122.853	4^+
		10327[a]	64[c] *5*	1368.667	2^+
11730	0^+	1765[a]	3.48[c] *22*	9965.3	1^+
		4174[a]	1.63[c] *11*	7555.3	1^-
		7490[a]	3.59[c] *22*	4238.35	2^+
		10359[a]	100.0[c] *22*	1368.667	2^+
11860	(8^+)	3747.0[‡]	100	8113.2	6^+
11862.8	1^-	4306[a]	4.4[c] *4*	7555.3	1^-
		4513[a]	1.75[c] *18*	7348.60	2^+
		7622[a]	4.4[c] *4*	4238.35	2^+
		10491[a]	65[c] *4*	1368.667	2^+
		11859[a]	100[c] *4*	0	0^+
11932.9	$(3)^+$	2631.9[a]	0.19 *7*	9301.07	(4^+)
		3068.4[a]	0.34 *7*	8864.5	2^-
		4120.5[a]	1.41 *16*	7812.4	$(4^-,5^+)$
		4583.6[a]	1.62 *19*	7348.60	2^+
		5922.0[a]	4.3 *5*	6010.34	4^+
		6696.9[a]	1.27 *21*	5235.16	3^+
		7693.4[a]	0.51 *19*	4238.35	2^+
		7808.9[a]	24.4 *24*	4122.853	4^+
		10561.9[a]	100 *10*	1368.667	2^+
11966.6	2^+	760[a]	0.9[c] *3*	11207	
		1236[a]	3.7[c] *6*	10731.1	2^+
		1908[a]	12.0[c] *6*	10059.1	$(1,2)^+$
		2001[a]	4.9[c] *6*	9965.3	1^+
		5534[a]	9.4[c] *6*	6432.2	0^+
		6731[a]	60[c] *3*	5235.16	3^+
		7727[a]	46[c] *3*	4238.35	2^+
		7842[a]	3.4[c] *3*	4122.853	4^+
		10596[a]	100[c] *6*	1368.667	2^+
		11964[a]	46[c] *3*	0	0^+
11988.5	2^+	1257.4[a]	0.9 *4*	10731.1	2^+
		1929.3[a]	1.5 *9*	10059.1	$(1,2)^+$
11988.5	2^+	2703.9[a]	2.0 *11*	9284.4	$2^+,4^+$
		2984.8[a]	1.3 *7*	9003.5	2^+
		3122.8[a]	11 *5*	8864.5	2^-
		3549.8[a]	6.3 *4*	8438.4	1^-
		4240.4[a]	11 *5*	7747.7	1^+
		4432.8[a]	3.3 *17*	7555.3	1^-
		6752.3[a]	17 *9*	5235.16	3^+
		7748.8[a]	100 *5*	4238.35	2^+
		10617.3[a]	61 *2*	1368.667	2^+
		11985.3[a]	1.7 *9*	0	0^+
12003		991[a]	19[c] *3*	11012	$3,5^+$
		3563[a]	9.5[c] *16*	8439.29	4^+
		5992[a]	30[c] *3*	6010.34	4^+
		7879[a]	100[c] *3*	4122.853	4^+
12051.3	4^+	6040[a]	6.9[c] *7*	6010.34	4^+
		6815[a]	30.6[c] *14*	5235.16	3^+
		7927[a]	100[c] *3*	4122.853	4^+
		10680[a]	1.4[c] *3*	1368.667	2^+
12119.0	4^+	2603[a]	100[c] *8*	9516.18	4^+
		6108[a]	27[c] *5*	6010.34	4^+
		7879[a]	92[c] *5*	4238.35	2^+
		7995[a]	38[c] *5*	4122.853	4^+
		10748[a]	14[c] *3*	1368.667	2^+
12128		4315[a]	100	7812.4	$(4^-,5^+)$
12162	4^+	2646[a]	17.6[c] *20*	9516.18	4^+
		3158[a]	3.9[c] *10*	9003.5	2^+
		6926[a]	5.9[c] *20*	5235.16	3^+
		7922[a]	11.8[c] *20*	4238.35	2^+
		8038[a]	100[c] *6*	4122.853	4^+
		10791[a]	57[c] *6*	1368.667	2^+
12183.3		966.6[a]	2.1 *11*	11216.69	$3^+,4^+$
		1452.2[a]	2.0 *10*	10731.1	2^+
		1822.5[a]	5.0 *25*	10360.7	2^+
		2217.9[a]	1.4 *7*	9965.3	1^+
		3528.1[a]	4.8 *24*	8654.9	2^+
		4435.2[a]	3.7 *18*	7747.7	1^+
		5750.4[a]	1.8 *10*	6432.2	0^+
		7943.5[a]	12.8 *7*	4238.35	2^+
		10812.0[a]	100 *6*	1368.667	2^+
		12180.0[a]	7 *4*	0	0^+

Adopted Levels, Gammas (continued)

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f
12259.3	2^-	1042.6[a]	3.3 *18*	11216.69	$3^+,4^+$
		2293.9[a]	1.1 *7*	9965.3	1^+
		2431.0[a]	2.2 *11*	9828.0	1^+
		3255.6[a]	4.4 *22*	9003.5	2^+
		3394.5[a]	9 *4*	8864.5	2^-
		3819.7[a]	5.6 *28*	8439.29	4^+
		4910.2[a]	9 *4*	7348.60	2^+
		7023.0[a]	24.4 *22*	5235.16	3^+
		8019.5[a]	100 *5*	4238.35	2^+
		8135.0[a]	1.1 *7*	4122.853	4^+
		10888.0[a]	60 *2*	1368.667	2^+
		12255.9[a]	2.2 *11*	0	0^+
12340.2	3^+	1680.3[a]	1.1 *7*	10659.8	$(1,2^+)$
		3336.5[a]	5.1 *27*	9003.5	2^+
		3685.0[a]	2.4 *13*	8654.9	2^+
		4723.3[a]	9 *4*	7616.41	3^-
		4991.0[a]	29 *2*	7348.60	2^+
		7103.9[a]	47 *2*	5235.16	3^+
		8100.4[a]	100 *5*	4238.35	2^+
		8215.8[a]	4.9 *24*	4122.853	4^+
		10968.8[a]	24 *1*	1368.667	2^+
12342		4529[a]	100	7812.4	$(4^-,5^+)$
12400.3	3^+	2341.1[a]	3.9	10059.1	$(1,2)^+$
		2883.9[a]	18	9516.18	4^+
		2942.3[a]	2.8	9457.81	$(3)^+$
		3396.5[a]	4.9	9003.5	2^+
		4783.4[a]	10	7616.41	3^-
		5051.1[a]	31	7348.60	2^+
		7164.0[a]	44	5235.16	3^+
		8160.5[a]	100	4238.35	2^+
		8275.9[a]	6	4122.853	4^+
		11028.9[a]	36	1368.667	2^+
12404.9	2^+	3103.6[a]	2.4 *12*	9299.8	
		3401.1[a]	4.4 *22*	9003.5	2^+
		3540.1[a]	2.5 *13*	8864.5	2^-
		3749.7[a]	19 *1*	8654.9	2^+
		3966.1[a]	4.1 *21*	8438.4	1^-
		4046.4[a]	1.6 *8*	8358.1	3^-
		4788.0[a]	12 *6*	7616.41	3^-
		5055.7[a]	3.0 *15*	7348.60	2^+

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f
12404.9	2^+	7168.6[a]	1.9 *10*	5235.16	3^+
		8165.1[a]	100 *5*	4238.35	2^+
		8280.5[a]	1.4 *8*	4122.853	4^+
		11033.5[a]	3.3 *17*	1368.667	2^+
		12401.5[a]	3.0 *15*	0	0^+
12443	$6^+,7^-$	2415[a]	100	10027.97	5^-
12507	4^+	5158[a]	5.8[c] *10*	7348.60	2^+
		7271[a]	15.4[c] *19*	5235.16	3^+
		8267[a]	46[c] *4*	4238.35	2^+
		8382[a]	25[c] *4*	4122.853	4^+
		11136[a]	100[c] *6*	1368.667	2^+
12527.6	1^+	1796.4[a]	1.9 *10*	10731.1	2^+
		2468.4[a]	6 *3*	10059.1	$(1,2)^+$
		2699.2[a]	2.6 *13*	9828.0	1^+
		3662.8[a]	7 *3*	8864.5	2^-
		3872.4[a]	13 *6*	8654.9	2^+
		4088.8[a]	7 *4*	8438.4	1^-
		4779.4[a]	16 *8*	7747.7	1^+
		6094.6[a]	33 *2*	6432.2	0^+
		8287.7[a]	36 *2*	4238.35	2^+
		11156.2[a]	15 *8*	1368.667	2^+
		12524.1[a]	100 *5*	0	0^+
12638.7	4^+	3180.7[a]	0.9 *5*	9457.81	$(3)^+$
		4825.8[a]	3.6 *18*	7812.4	$(4^-,5^+)$
		6627.4[a]	15.8 *8*	6010.34	4^+
		7402.3[a]	8.7 *43*	5235.16	3^+
		8398.8[a]	0.7 *4*	4238.35	2^+
		8514.2[a]	100 *5*	4122.853	4^+
		11267.2[a]	2.0 *11*	1368.667	2^+
12660.8	3^-	1930[a]	5[c] *3*	10731.1	2^+
		2602[a]	16[c] *3*	10059.1	$(1,2)^+$
		3144[a]	22[c] *3*	9516.18	4^+
		3796[a]	27[c] *5*	8864.5	2^-
		4913[a]	5[c] *3*	7747.7	1^+
		5312[a]	19[c] *3*	7348.60	2^+
		7424[a]	8[c] *3*	5235.16	3^+
		8421[a]	100[c] *11*	4238.35	2^+
		8536[a]	16[c] *3*	4122.853	4^+
		11289[a]	51[c] *5*	1368.667	2^+
12670.0	2^-	682.5[a]	0.36 *2*	11988.5	2^+

Adopted Levels, Gammas (continued)

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	Comments
12670.0	2^-	1217.1[a]	0.17 *2*	11452.8	2^+		
		1462.9[a]	0.20 *3*	11207			
		1482.6[a]	0.19 *2*	11187.3			
		1752.7[a]	0.11 *1*	10917.2	2^+		
		1849.1[a]	0.07 *1*	10820.8	$3^+,4^+$		
		1938.8[a]	0.81 *3*	10731.1	2^+		
		1957.7[a]	0.42 *2*	10712.2	1^+		
		2010.1[a]	0.17 *2*	10659.8	$(1,2^+)$		
		2309.1[a]	0.04 *2*	10360.7	2^+		
		2336.4[a]	0.28 *2*	10333.6	3^-		
		2610.7[a]	0.25 *3*	10059.1	$(1,2)^+$		
		2704.5[a]	0.29 *2*	9965.3	1^+		
		2841.6[a]	1.02 *5*	9828.0	1^+		
		3137.1[a]	2.03 *8*	9532.7	$(2,3)^+$		
		3385.3[a]	1.12 *5*	9284.4	$2^+,4^+$		
		3523.5[a]	0.45 *3*	9146.2	1^-		
		3666.2[a]	0.67 *5*	9003.5	2^+		
		3805.2[a]	24.0 *8*	8864.5	2^-	D	Mult.: From (p,γ), ΔJ=0.
		4014.7[a]	0.47 *3*	8654.9	2^+		
		4231.1[a]	5.0 *5*	8438.4	1^-		
		4311.5[a]	2.35 *8*	8358.1	3^-		
		4921.8[a]	6.88 *22*	7747.7	1^+		
		5053.0[a]	0.05 *2*	7616.41	3^-		
		5114.1[a]	2.53 *10*	7555.3	1^-		
		5320.8[a]	0.07 *2*	7348.60	2^+		
		7433.6[a]	0.10 *3*	5235.16	3^+		
		8430.1[a]	100.0 *13*	4238.35	2^+	D	Mult.: From (p,γ), ΔJ=0.
		11298.5[a]	17.3 *7*	1368.667	2^+		
		12666.4[a]	0.42 *5*	0	0^+		
12807.8	2^+	6374.7[a]	1.5 *8*	6432.2	0^+		
		7571.4[a]	3.0 *15*	5235.16	3^+		
		8567.8[a]	7.6 *38*	4238.35	2^+		
		11436.2[a]	39 *2*	1368.667	2^+		
		12802.1[a]	100 *5*	0	0^+		
12818.1	1^+	2457.3[a]	2.6 *13*	10360.7	2^+		
		2989.7[a]	3.9 *19*	9828.0	1^+		
		3953.3[a]	6 *3*	8864.5	2^-		
		4162.8[a]	17 *8*	8654.9	2^+		
		4379.3[a]	9 *5*	8438.4	1^-		
		5069.8[a]	18 *9*	7747.7	1^+		

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Adopted Levels, Gammas (continued)

$\gamma(^{24}$Mg) (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f
12818.1	1^+	6385.0[a]	18 *9*	6432.2	0^+
		7581.6[a]	2.6 *13*	5235.16	3^+
		8578.1[a]	54 *3*	4238.35	2^+
		11446.5[a]	26 *13*	1368.667	2^+
		12814.4[a]	100 *5*	0	0^+
12846.9	$(3^-,4^+)$	6835.5[a]	6.1 *31*	6010.34	4^+
		7610.4[a]	4.1 *20*	5235.16	3^+
		8606.9[a]	100 *5*	4238.35	2^+
		8722.3[a]	73 *4*	4122.853	4^+
		11475.3[a]	20 *10*	1368.667	2^+
12854	$(1^+,2^+,3^+)$	7618[a]	52 *3*	5235.16	3^+
		8614[a]	100 *5*	4238.35	2^+
		11482[a]	18 *9*	1368.667	2^+
		12850[a]	9 *5*	0	0^+
12861	$2^+,3^-$	3560[a]	52[c] *4*	9301.07	(4^+)
		4422[a]	40[c] *4*	8438.4	1^-
		6850[a]	100[c] *4*	6010.34	4^+
		8736[a]	19[c] *4*	4122.853	4^+
12895.1	1^+	4239.8[a]	4.2 *21*	8654.9	2^+
		5146.8[a,f]	6.9 *35*	7747.7	1^+
		7658.6[a]	16.7 *8*	5235.16	3^+
		8655.1[a]	11 *6*	4238.35	2^+
		11523.4[a]	100 *6*	1368.667	2^+
12921.6	$(2^+,3^-,4^+)$	3636.9[a]	24 *12*	9284.4	$2^+,4^+$
		4266.3[a]	14 *7*	8654.9	2^+
		4563.0[a]	59 *3*	8358.1	3^-
		7685.1[a]	100 *5*	5235.16	3^+
		8681.6[a]	72 *4*	4238.35	2^+
		8797.0[a]	52 *3*	4122.853	4^+
		11549.9[a]	24 *12*	1368.667	2^+
12955.5	1^+	1502.6[a]	0.06 *1*	11452.8	2^+
		2243.2[a]	0.016 *5*	10712.2	1^+
		2275.7[a]	0.021 *4*	10679.7	0^+
		2594.6[a]	1.43 *5*	10360.7	2^+
		2844.4[a]	0.123 *6*	10110.9	(0^+)
		2896.2[a]	0.157 *7*	10059.1	$(1,2)^+$
		2990.0[a]	0.029 *4*	9965.3	1^+
		3127.1[a]	0.89 *2*	9828.0	1^+
		3649.8[a]	0.81 *2*	9305.39	0^+
		3809.0[a]	0.65 *2*	9146.2	1^-

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f	Mult.[d]	Comments
12955.5	1^+	3951.6[a]	0.030 2	9003.5	2^+		
		4090.6[a]	0.31 1	8864.5	2^-		
		4300.2[a]	0.20 1	8654.9	2^+		
		4516.6[a]	0.064 5	8438.4	1^-		
		5206.6[a]	0.014 2	7747.7	1^+		
		5605.1[a]	0.16 6	7348.60	2^+		
		6521.4[a]	1.17 4	6432.2	0^+		
		8714.8[a]	1.12 4	4238.35	2^+		
		11583.2[a]	100.0 5	1368.667	2^+		
		12951.1[a]	9.6 4	0	0^+		
12963.9	2^-	2904.6[a]	4.1	10059.1	$(1,2)^+$		
		7727.4[a]	21	5235.16	3^+		
		8723.8[a]	4.1	4238.35	2^+		
		11592.2[a]	100	1368.667	2^+		
		12960.1[a]	8.2	0	0^+		
13029.8	$2^+,3^-$	2668.9[a]	1.0	10360.7	2^+		
		3571.7[a]	4.1	9457.81	$(3)^+$		
		3729.7[a]	3.1	9299.8			
		4025.9[a]	8	9003.5	2^+		
		4374.5[a]	4.1	8654.9	2^+		
		4590.9[a]	3.1	8438.4	1^-		
		5412.7[a]	22	7616.41	3^-		
		7793.3[a]	100	5235.16	3^+		
		8789.7[a]	49	4238.35	2^+		
		8905.2[a]	6.1	4122.853	4^+		
		11658.1[a]	3.5	1368.667	2^+		
13048	0^+	3082[a]	70[c] 7	9965.3	1^+		
		3220[a]	100[c] 7	9828.0	1^+	D	Mult.: From $\gamma\gamma(\theta)$ (1978Fi08 – (α,γ)).
		4609[a]	30[c] 5	8438.4	1^-		
		5300[a]	23[c] 5	7747.7	1^+		
		5492[a]	14[c] 5	7555.3	1^-		
13050.0	4^+	922.0[a]	0.040 4	12128			
		1719.0[a]	0.021 7	11330			
		1833.2[a]	0.32 1	11216.69	$3^+,4^+$		
		2229.1[a]	0.052 5	10820.8	$3^+,4^+$		
		2389.7[a]	0.30 1	10660.17	$(3^+,4^+)$		
		2468.6[a]	2.28 7	10581.26	$(2^+,3^+,4^+)$		
		3021.8[a]	0.52 2	10027.97	5^-		
		3591.9[a]	2.52 8	9457.81	$(3)^+$		
		3748.6[a]	0.09 3	9301.07	(4^+)		

$^{24}_{12}Mg_{12}$-31

Adopted Levels, Gammas (continued)

γ(^{24}Mg) (continued)

E_i(level)	J^π_i	E_γ	I_γ[b]	E_f	J^π_f
13050.0	4^+	3749.9[a]	0.35 *3*	9299.8	
		3765.3[a]	0.139 *6*	9284.4	$2^+,4^+$
		5237.0[a]	0.20 *1*	7812.4	$(4^-,5^+)$
		5432.9[a]	0.013 *4*	7616.41	3^-
		7038.6[a]	1.83 *6*	6010.34	4^+
		7813.5[a]	1.58 *6*	5235.16	3^+
		8925.4[a]	100.0 *2*	4122.853	4^+
		11678.3[a]	0.09 *1*	1368.667	2^+
13057	5^-	2723[a]	16[c] *3*	10333.6	3^-
		4698[a]	15[c] *3*	8358.1	3^-
		5440[a]	16[c] *3*	7616.41	3^-
		8932[a]	100[c] *5*	4122.853	4^+
13088.8	2^+	3804.1[a]	27	9284.4	$2^+,4^+$
		4433.5[a]	6	8654.9	2^+
		4730.2[a]	67	8358.1	3^-
		7077.3[a]	10	6010.34	4^+
		7852.3[a]	100	5235.16	3^+
		8848.7[a]	40	4238.35	2^+
		8964.2[a]	63	4122.853	4^+
		11717.1[a]	20	1368.667	2^+
		13085.0[a]	0.7	0	0^+
13212.8		5099.0[‡]	100	8113.2	6^+
13345.7	3^-	1824[a]	1.9	11522	2^+
		2685.7[a]	19	10659.8	$(1,2^+)$
		3887.6[a]	19	9457.81	$(3)^+$
		4045.5[a]	28	9299.8	
		4341.8[a]	2.8	9003.5	2^+
		4905.9[a]	100	8439.29	4^+
		5728.6[a]	33	7616.41	3^-
		5996.3[a]	6	7348.60	2^+
		8109.1[a]	2.8	5235.16	3^+
		9105.5[a]	25	4238.35	2^+
		9220.9[a]	31	4122.853	4^+
		11973.8[a]	8	1368.667	2^+
		13341.7[a]	0.8	0	0^+
13366.9	(2)	2785[a]	100	10581.26	$(2^+,3^+,4^+)$
		5554[a]	35	7812.4	$(4^-,5^+)$
		11995[a]	9	1368.667	2^+
		13363[a]	9	0	0^+
13446.8	(1,2)	2056[a]	65 *3*	11391	1^-

$^{24}_{12}Mg_{12}$-32

$\gamma(^{24}Mg)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ[b]	E_f	J_f^π	Comments
13446.8	(1,2)	5008[a]	21 *10*	8438.4	1^-	
		9323[a]		4122.853	4^+	
		12075[a]	100 *4*	1368.667	2^+	
		13443[a]	23 *1*	0	0^+	
13474.9	2^+,3,4^+	7463[a]	60 *3*	6010.34	4^+	
		8238[a]	100 *5*	5235.16	3^+	
		9350[a]	15 *7*	4122.853	4^+	
		12103[a]	7 *4*	1368.667	2^+	
13771	5^-	5412[a]	100[c] *10*	8358.1	3^-	
		9646[a]	72[c] *10*	4122.853	4^+	
14081	1^+	3069[a]	40[c] *4*	11012	3,5^+	
		4779[a]	2.2[c] *9*	9301.07	(4^+)	
		8069[a]	80[c] *7*	6010.34	4^+	
		9956[a]	100[c] *7*	4122.853	4^+	
14150	8^+	4620[#] *25*	100[#] *4*	9527.6	(6^+)	
		6040[#] *25*	33[#] *4*	8113.2	6^+	
16904		5043[a]	100	11860	(8^+)	
19110	(10^+)	5856[a,f]	100	13212.8		E_γ: Tentatively placed in 2001Wi18 ((^{16}O,α),(^{16}O,$\alpha\gamma$)) with a measured energy 5927 keV *5*.

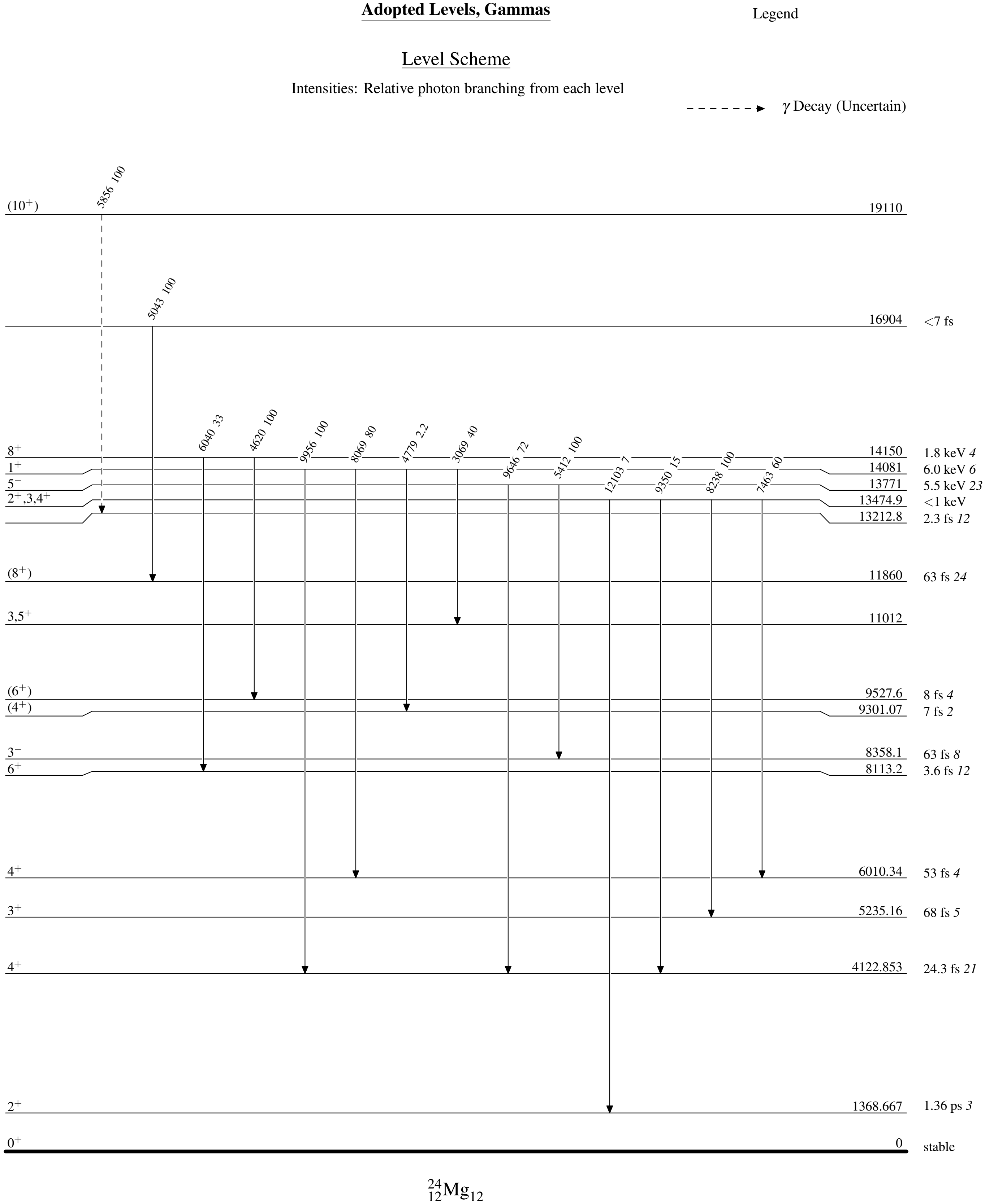
† From ^{24}Al ε decay (2.053 s).
‡ From (^{24}Mg,^{12}Cγ).
\# From (^{16}O,α),(^{16}O,$\alpha\gamma$).
@ From (^{12}C,γ).
& From ^{24}Al ε decay (130.7 ms).
[a] From level energy difference, recoil energy subtracted. Not considered in the least-squares fit.
[b] From (p,γ), except where otherwise noted.
[c] From (α,γ).
[d] From ^{24}Na β^- decay (14.956 h), except where otherwise noted.
[e] Additional information 1.
[f] Placement of transition in the level scheme is uncertain.

$^{24}_{12}$Mg$_{12}$-33

Adopted Levels, Gammas

Level Scheme

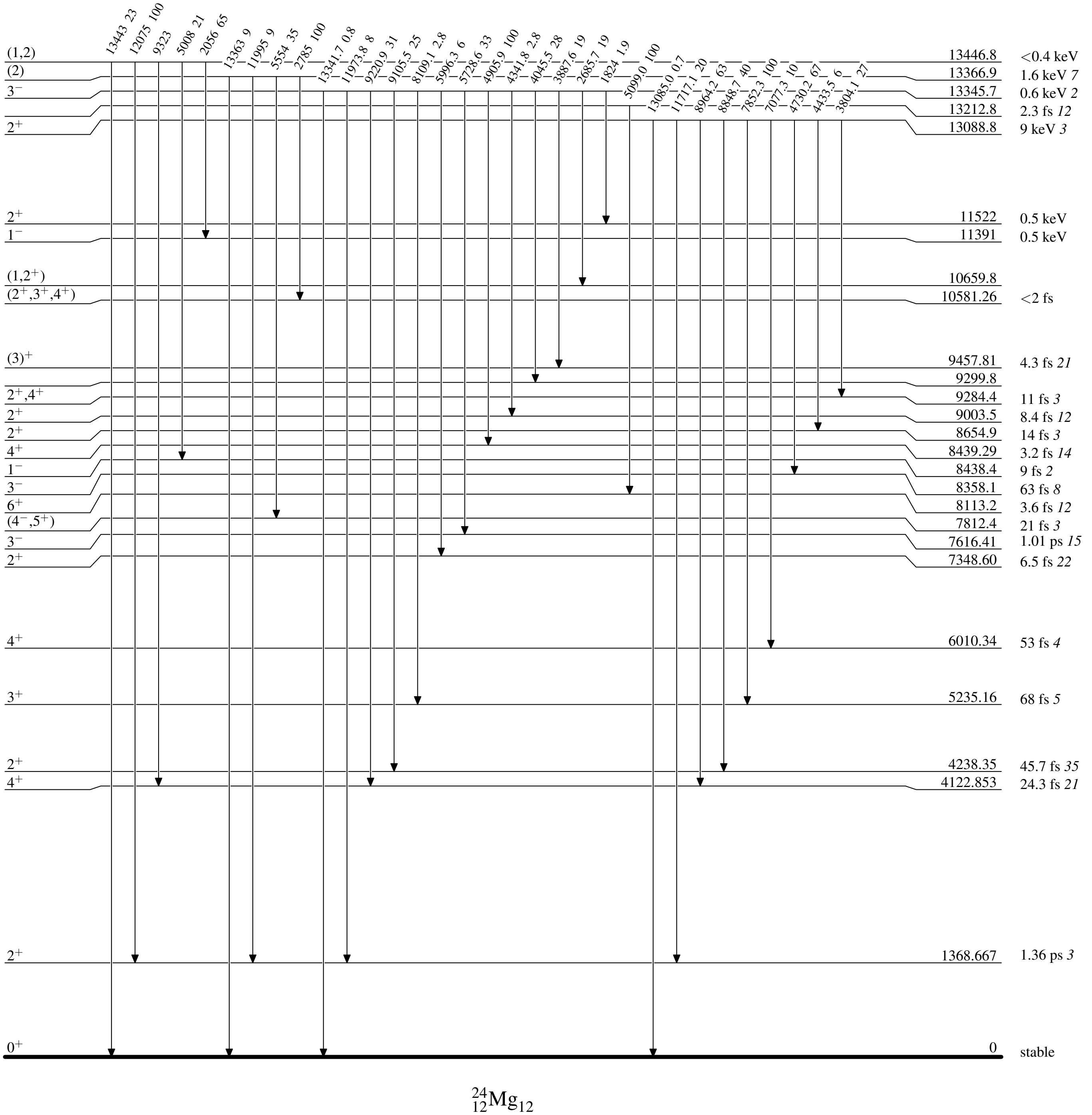
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

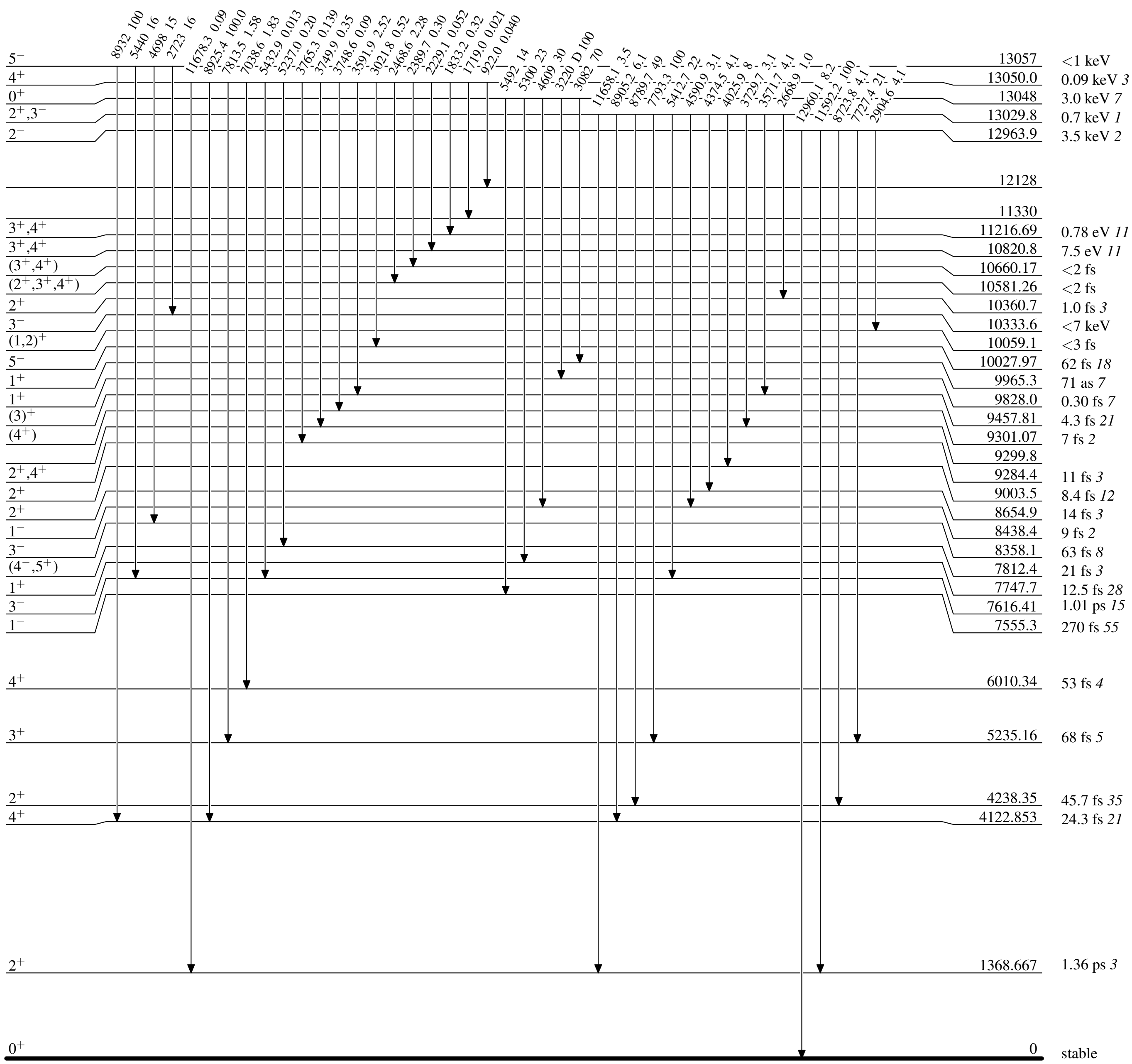
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{24}_{12}Mg_{12}$

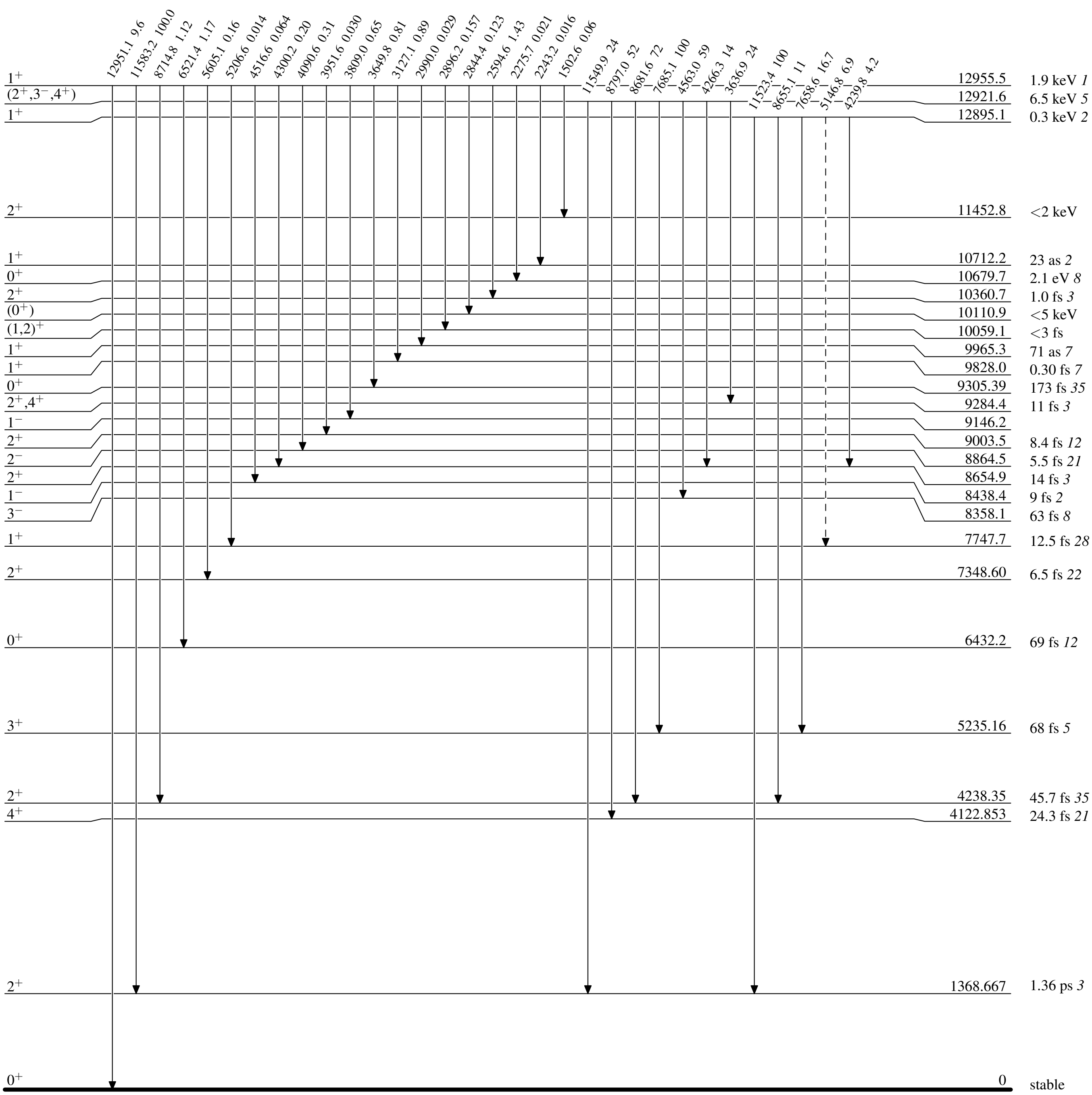
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

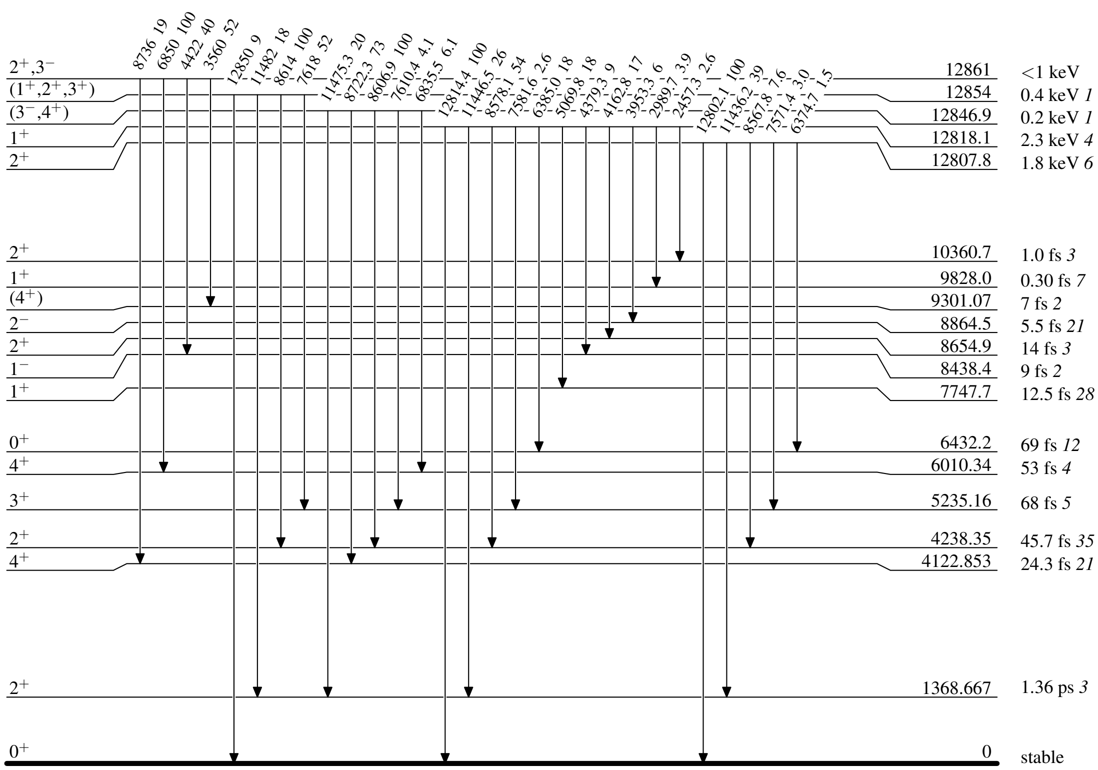


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

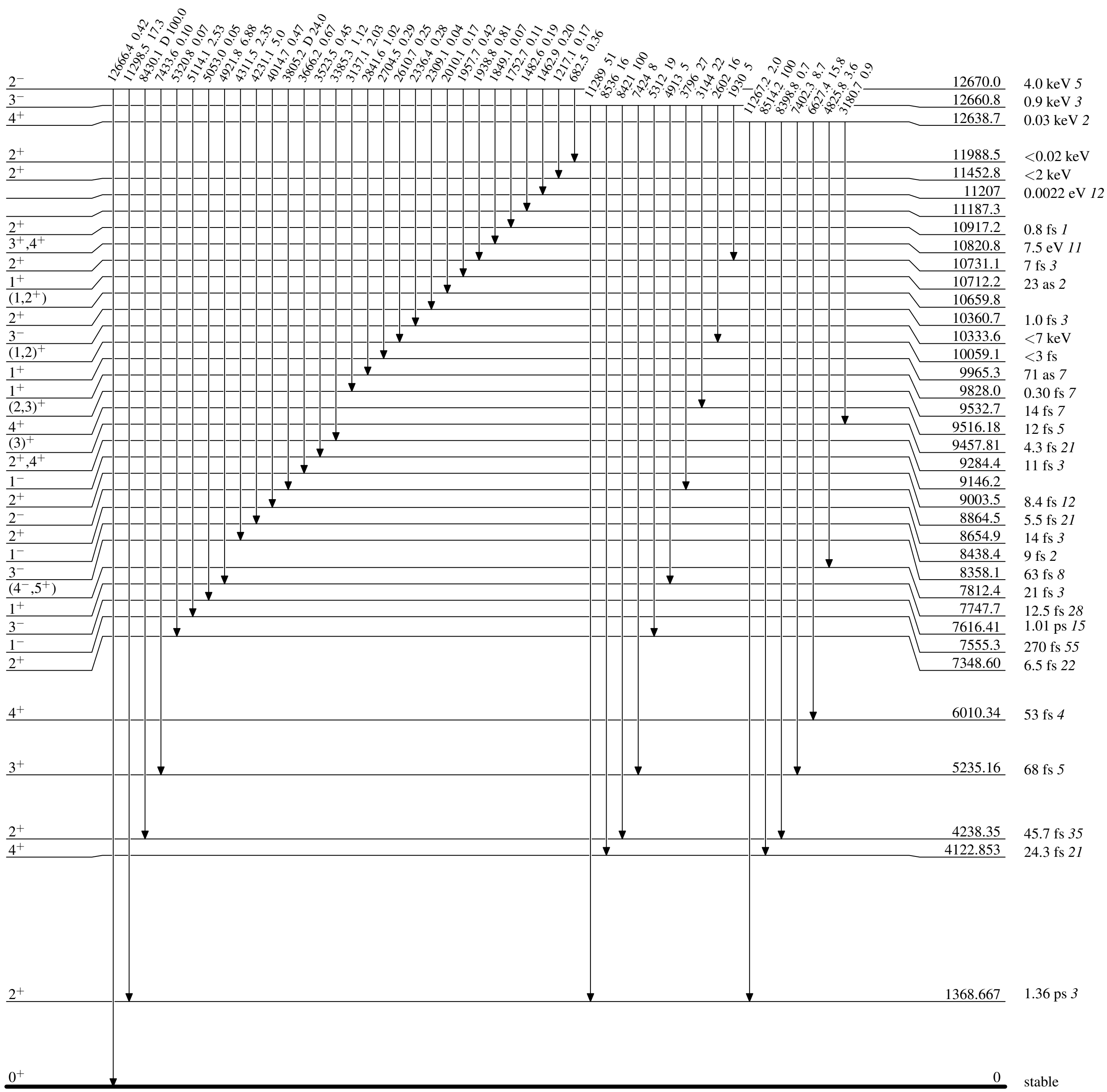


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

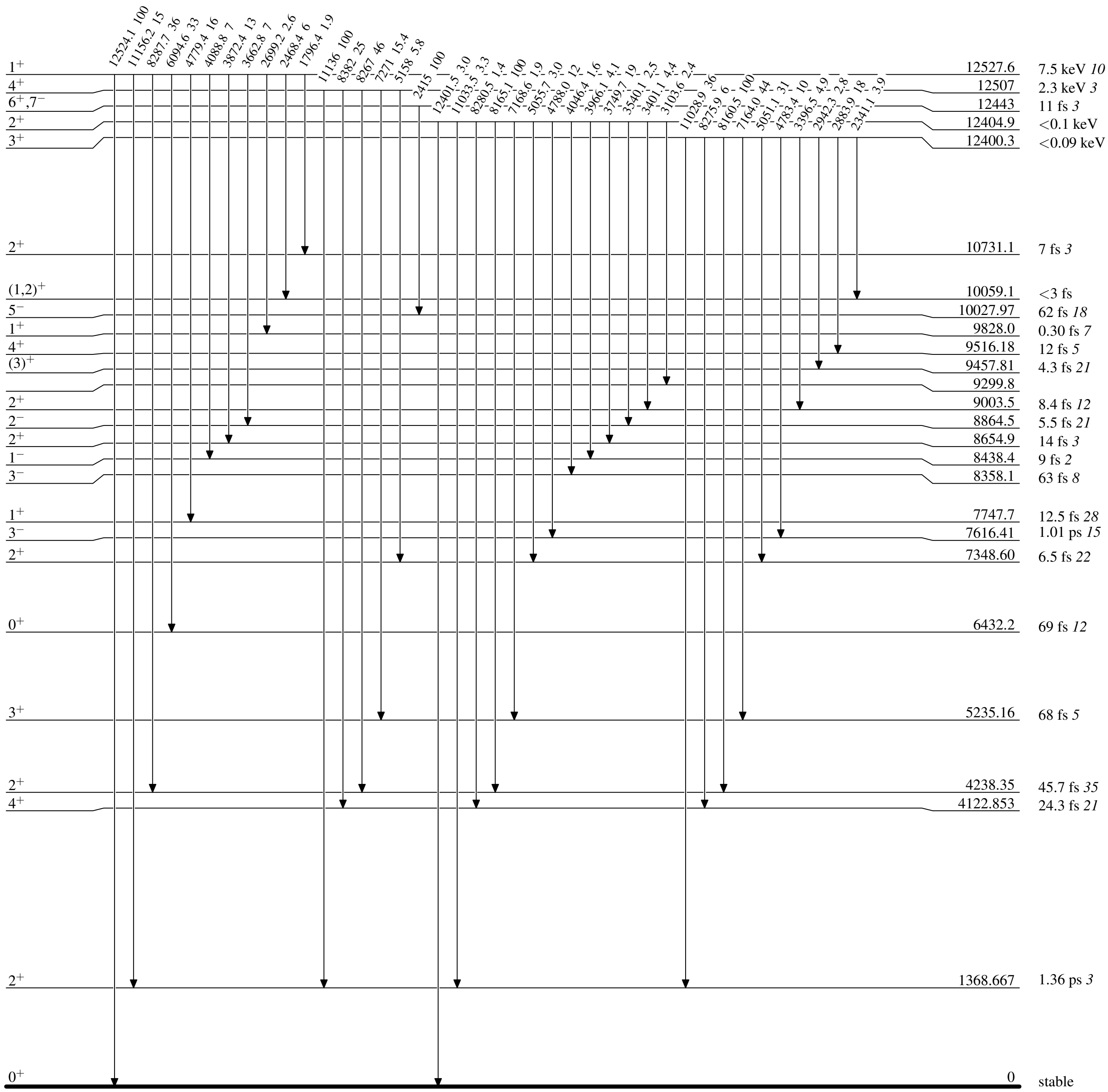


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

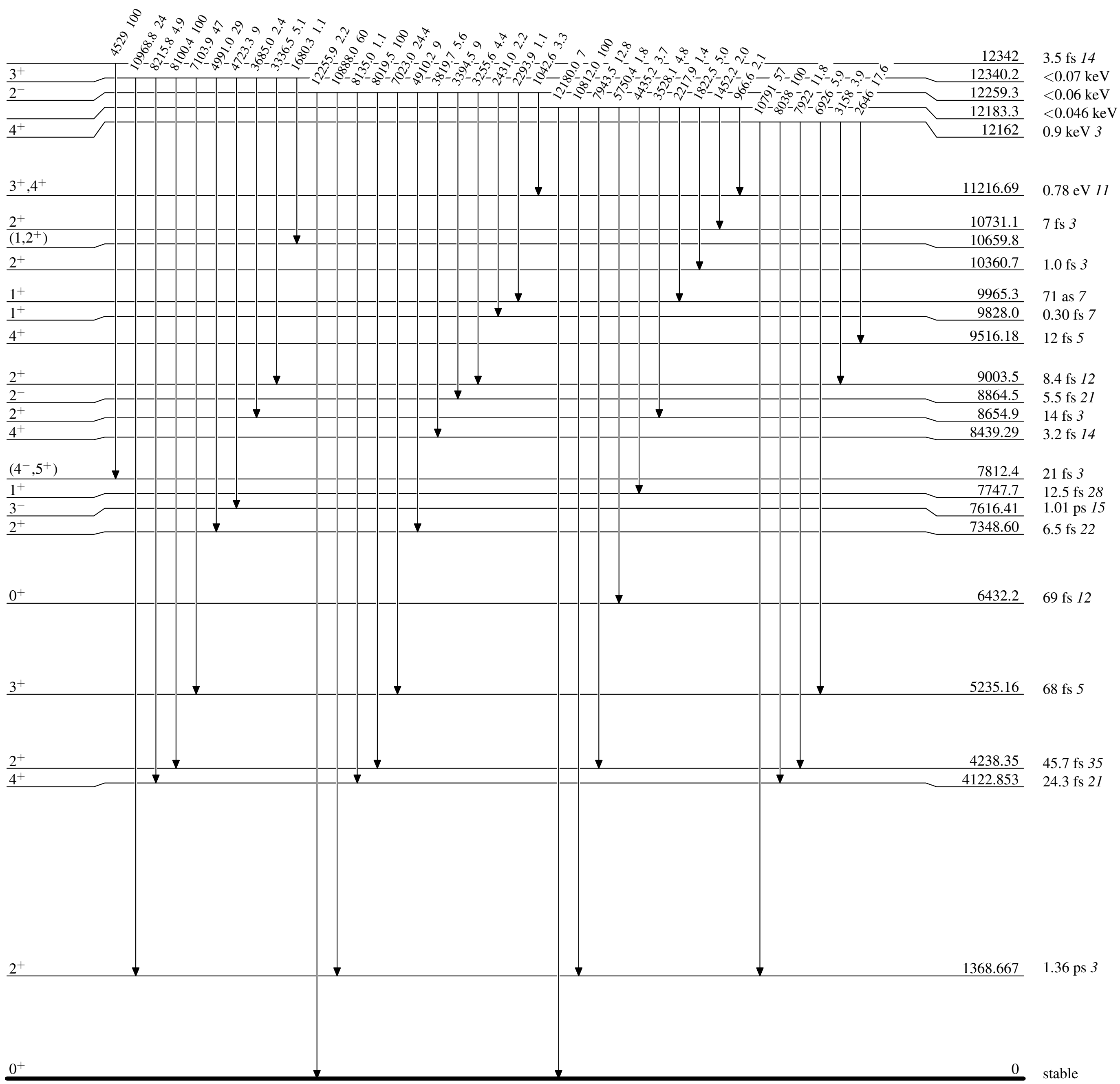


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

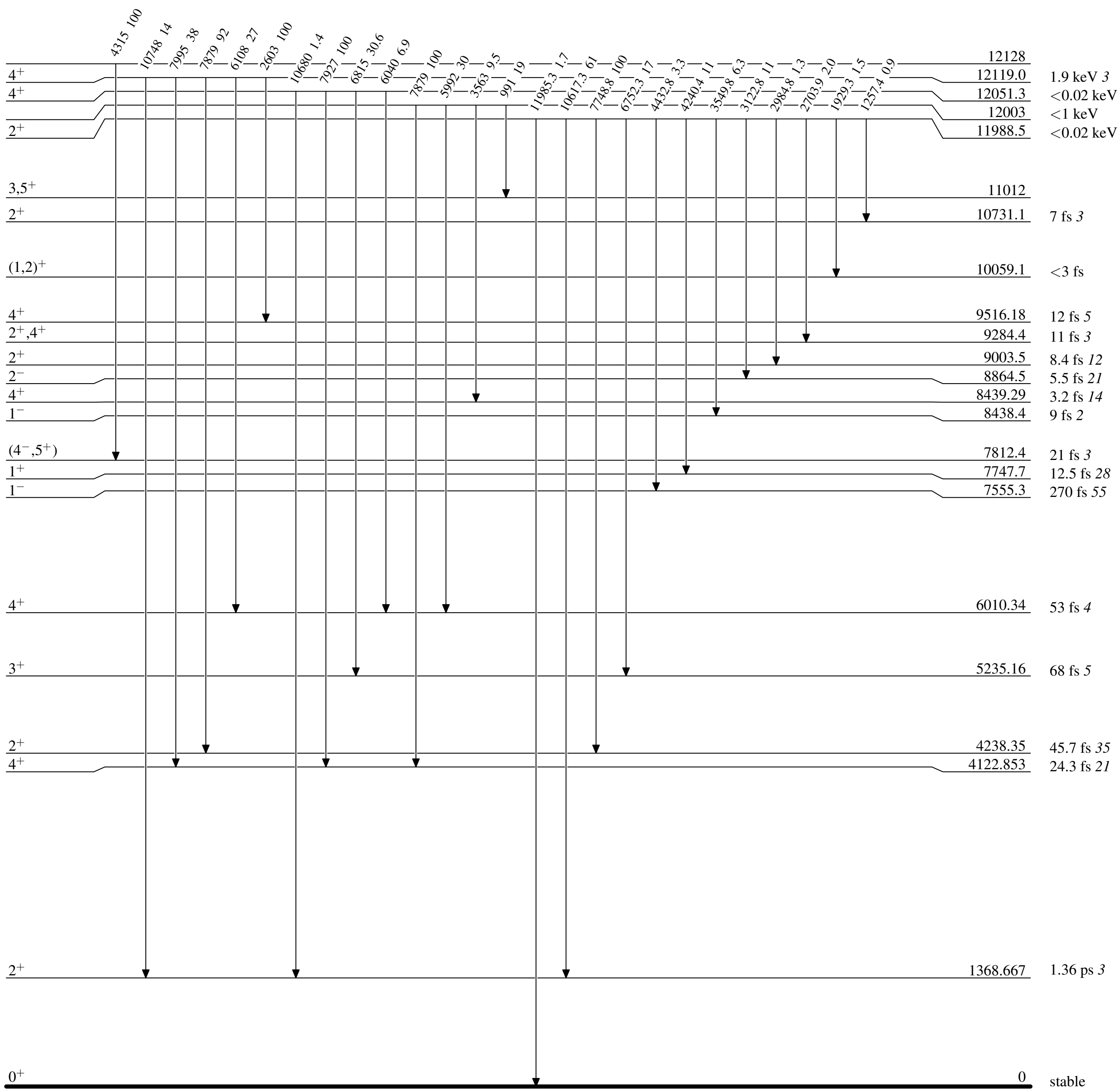


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

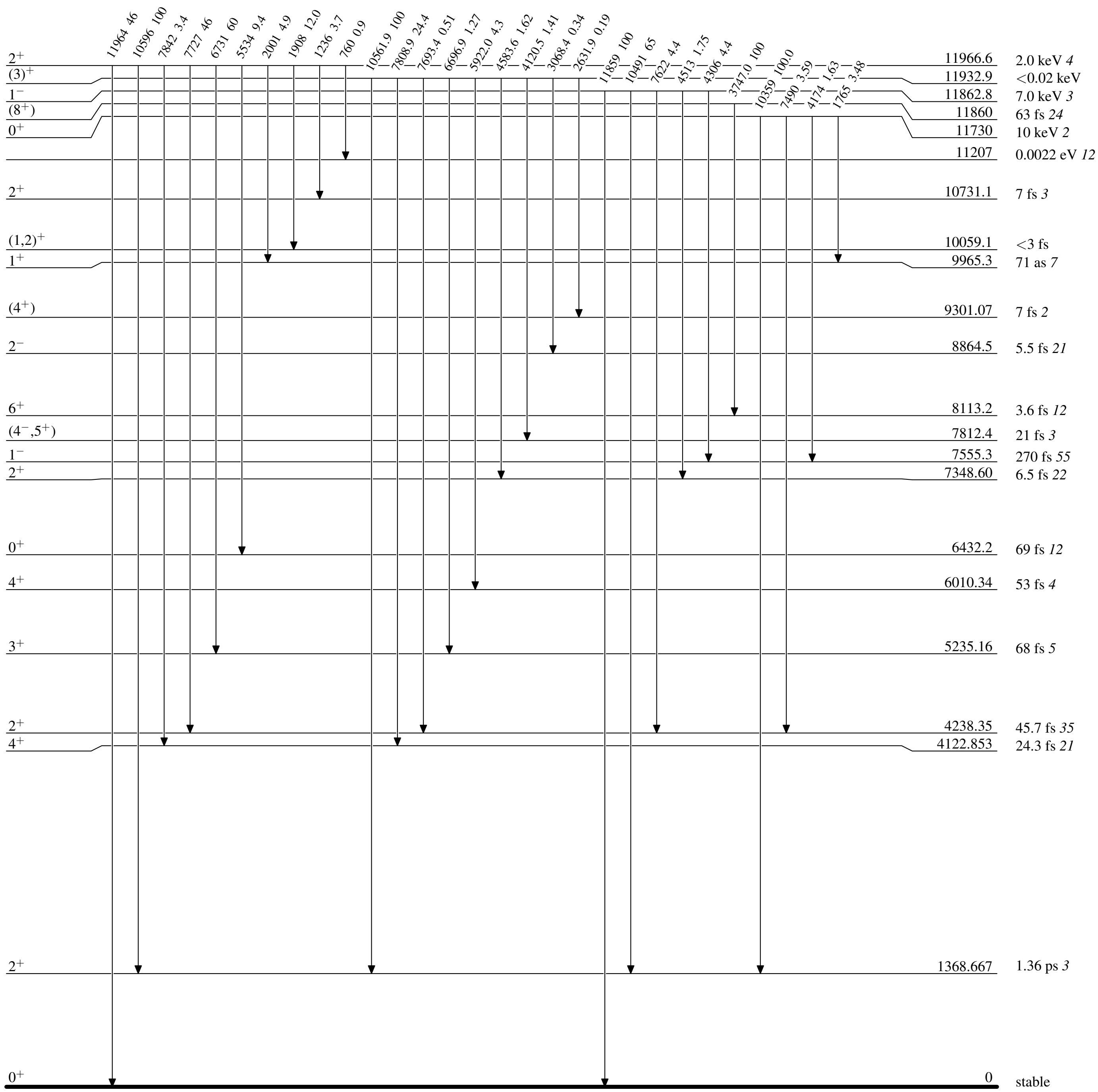


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

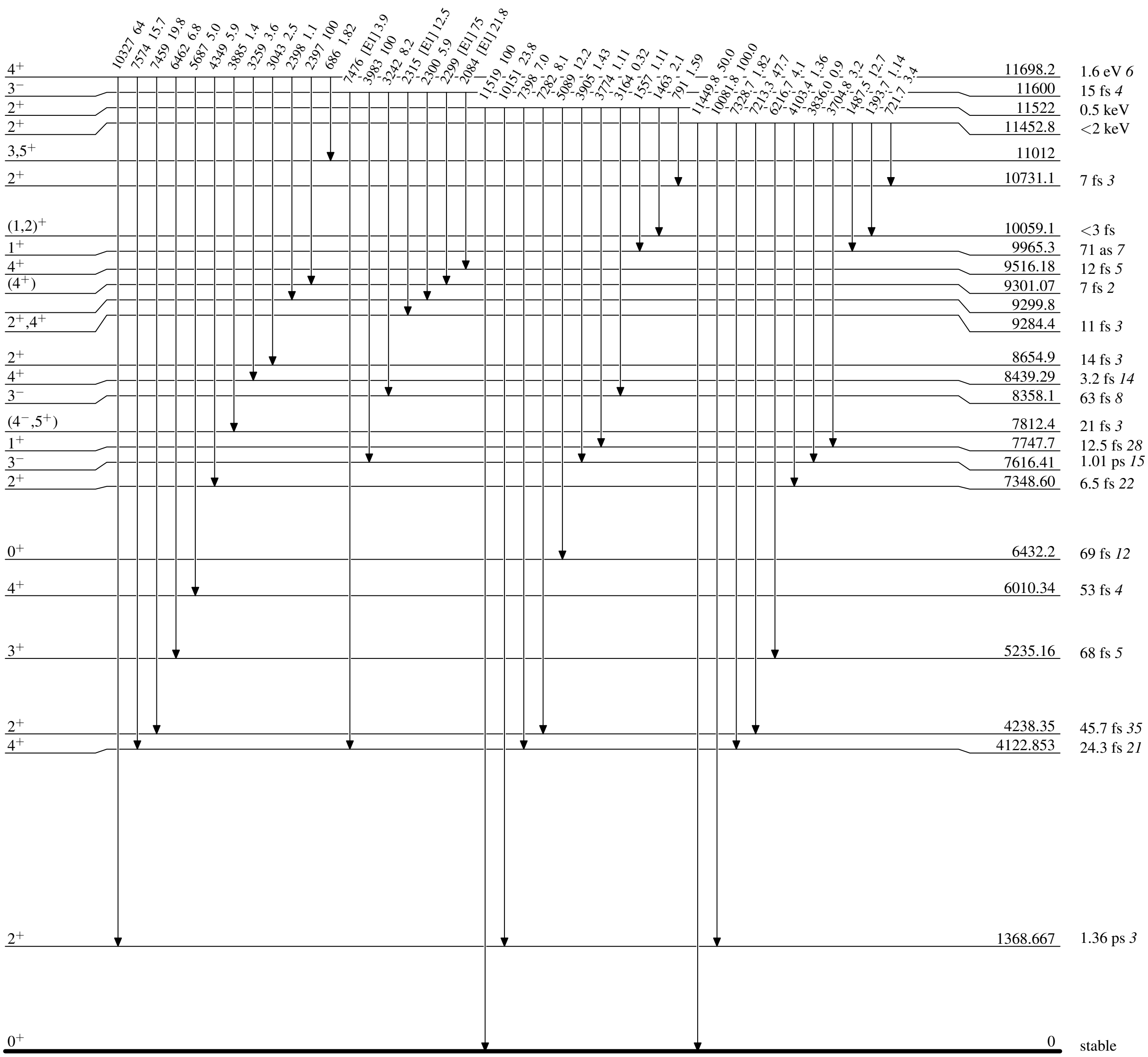


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

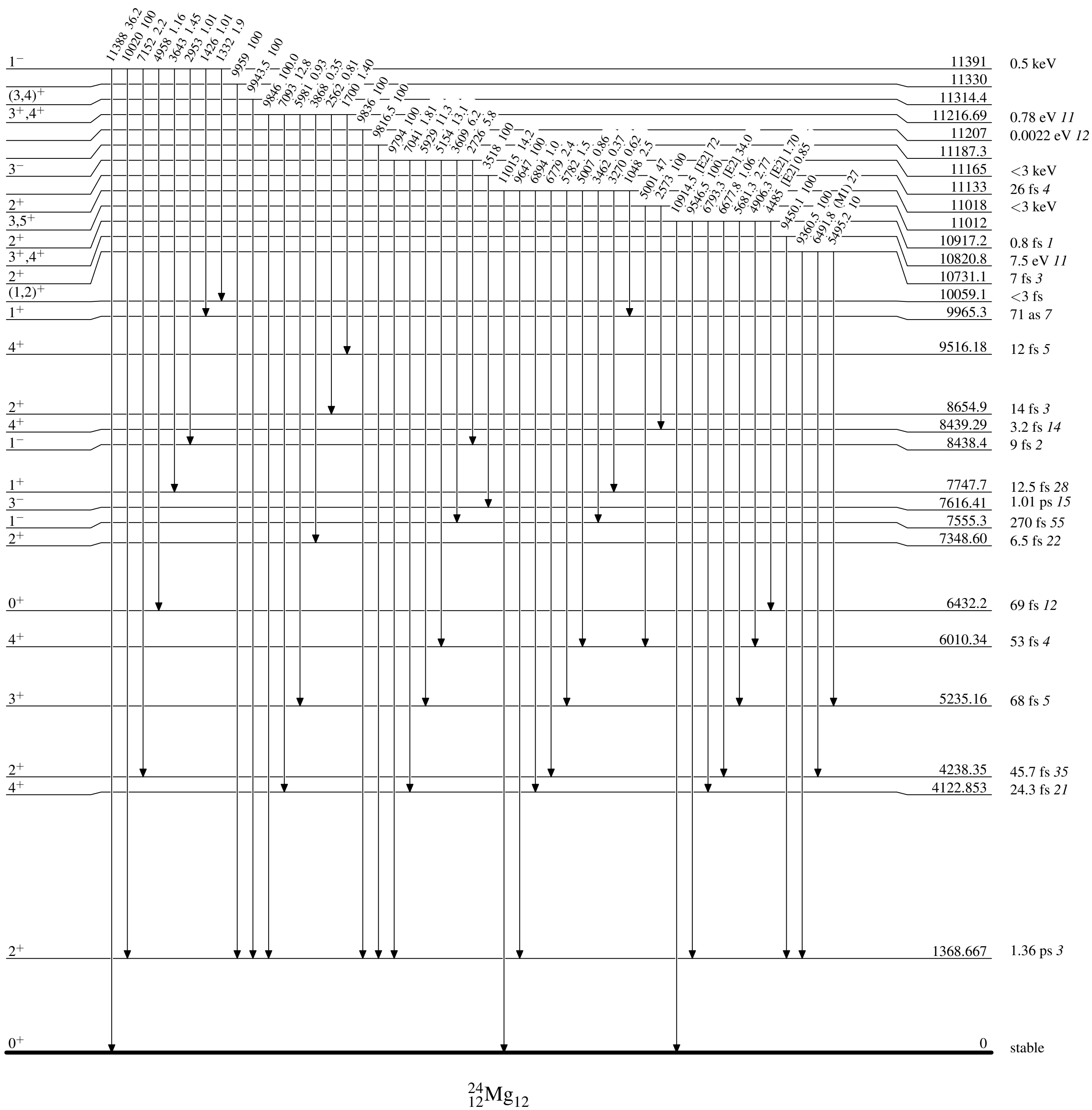


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

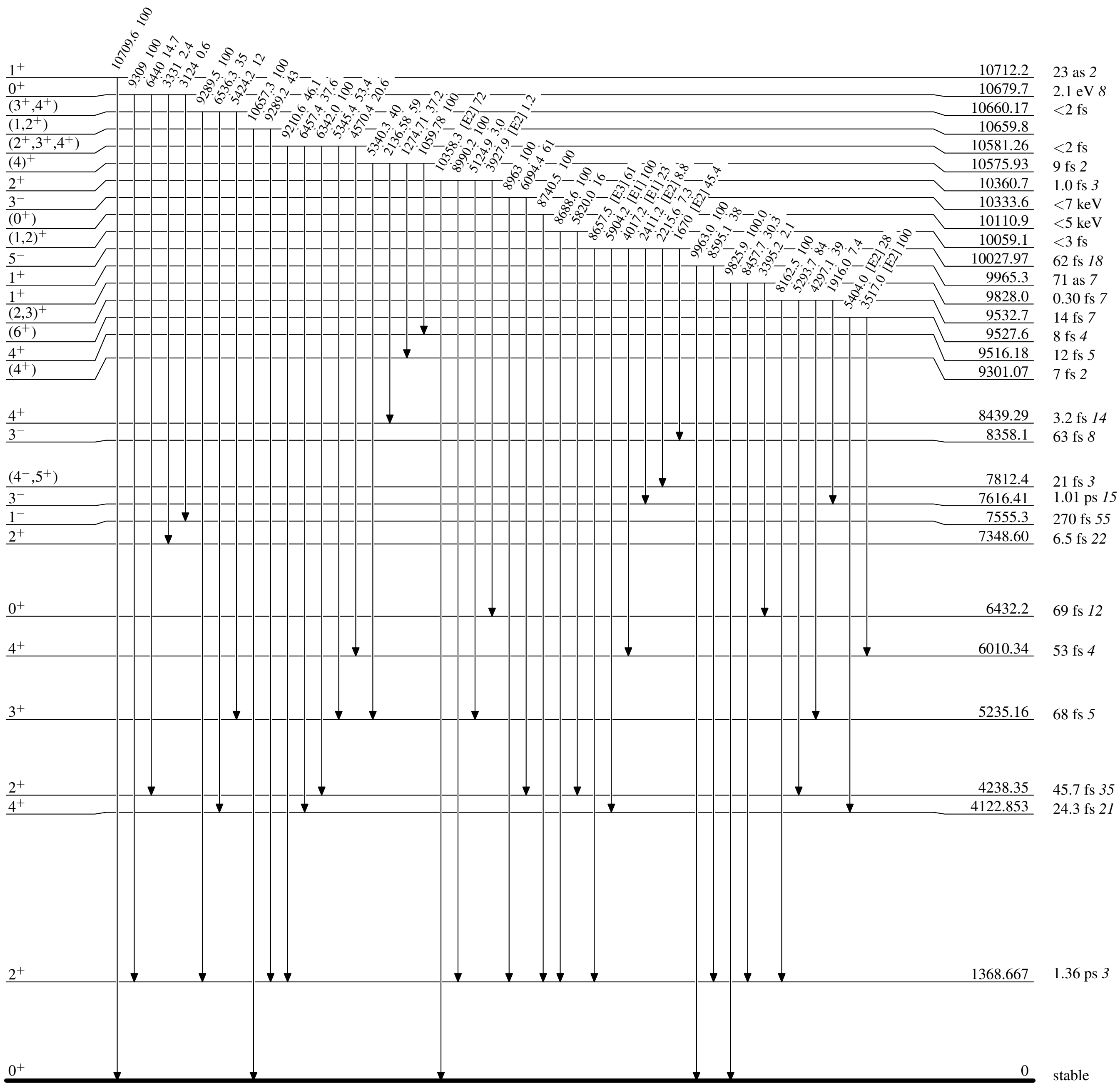
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

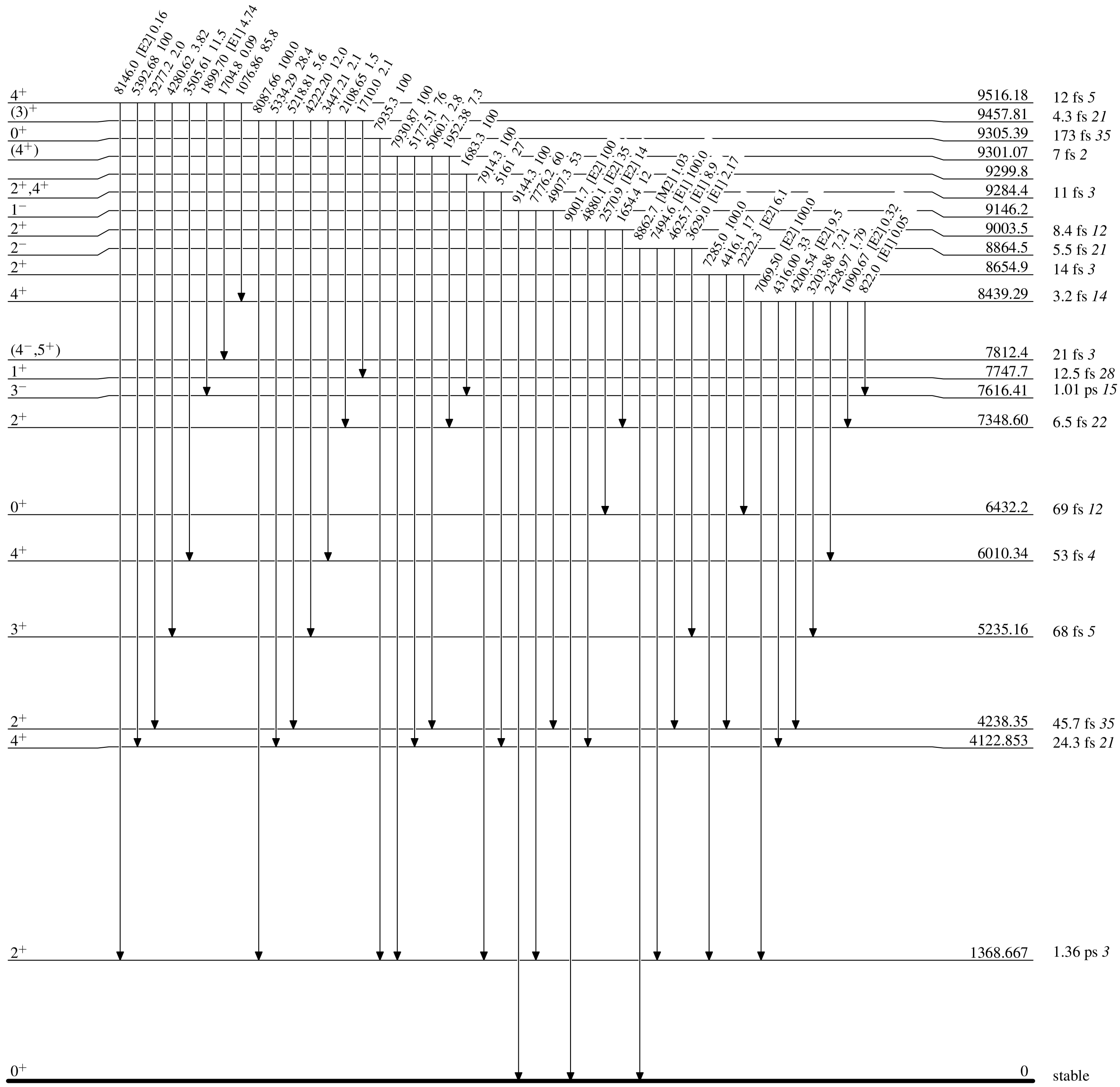


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

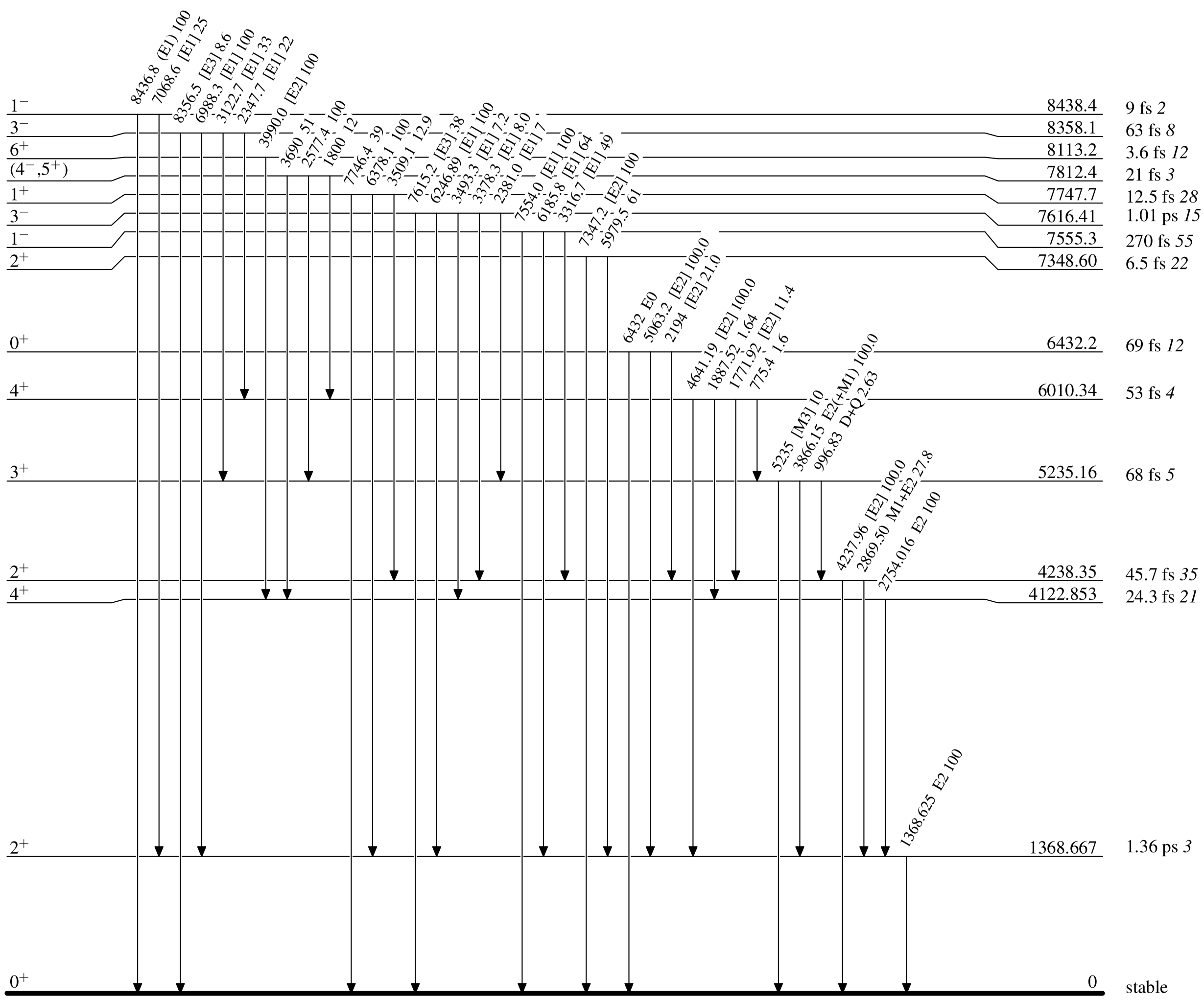


$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{24}_{12}Mg_{12}$

Adopted Levels, Gammas