Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

Q(β^-)=−10042 *7*; S(n)=10005 *7*; S(p)=2559 *7*; Q(α)=3198 *6* 2012Wa38

^{109}Te Levels

Cross Reference (XREF) Flags

- A ^{113}Xe α decay
- B ^{58}Ni(^{54}Fe,2pnγ)
- C ^{54}Fe(^{58}Ni,2pnγ)
- D ^{58}Ni(^{58}Ni,α2pnγ)

E(level)†	J$^\pi$‡	$T_{1/2}$#	XREF	Comments
0.0@	(5/2$^+$)	4.4 s *2*	ABCD	%ε+%β^+=96.1 *13*; %α=3.9 *13*; %β^+p=9.4 *31*; %$\beta^+\alpha$<0.0043 %α: from 1981Sc17; other: 4 3 from 1979Sc22. %β^+p is from %α=3.9 13 and I(β^+p)/I(α)=2.40 4 in 1985Ti02. %$\beta^+\alpha$ is from 1985Ti02. J$^\pi$: systematics of neighboring odd-N Te isotopes; favored α decay to J^π=(5/2$^+$), ^{105}Sn g.s; shell model predicts predominant $\nu d_{5/2}$ character. $T_{1/2}$: weighted average of 5.3 s 4 (using 3080-keVα(t) in 1965Ma12 and β^+p(t) in 1965Si04. Note, that in the original publications those values were assigned to ^{108}Te, but the reported $T_{1/2}$ and Eα are consistent with the adopted properties of ^{109}Te), 4.2 s 2 (using (β^+p(t)) in 1967Ka01), 4.9 s 4 (unweighted average of 5.3 s 7 (3080-keVα(t)) and 4.5 s 3 (β^+p(t)) in 1977Bo15), 4.1 s 2 (recommended in 1977Ki11 from 4.3 s 3 (3080-keVα(t)) and 4.03 s 15 (β^+p(t))) and 4.6 s 3 from (ε+β^+)γ(t) in 2002Re28. configuration: $\nu d^1_{5/2}$. Eα=3080 15 keV (1978Ro19), 3040 keV 30 (1977Ki11) and 3080 keV 30 (1965Ma12).
98.12& *10*	(7/2$^+$)		BCD	J$^\pi$: 98.1γ M1(+E2) to (5/2$^+$); band assignment. configuration: $\nu g^1_{7/2}$.
265.4a *3*	(5/2$^+$)		BCD	J$^\pi$: 265.4γ (M1+E2) to (5/2$^+$).
538.04@ *21*	(7/2$^+$)		BCD	J$^\pi$: 538.2γ M1(+E2) to (5/2$^+$), band assignment.
690.23a *13*	(9/2$^+$)	24 ps *5*	BCD	J$^\pi$: 424.8γ E2 to (5/2$^+$), 592.0γ M1+E2 to (7/2$^+$), band assignment.
763.10 *15*	(9/2$^+$)	3.1 ps *20*	BCD	J$^\pi$: 763.1γ E2 to (5/2$^+$).
772.00& *22*	(11/2$^+$)		BCD	J$^\pi$: 674.5γ E2 to (7/2$^+$), band assignment.
1089.14b *14*	(11/2$^-$)	67.0 ps *21*	BCD	J$^\pi$: 326.2γ (E1) to (9/2$^+$), 317.2γ (E1) to (11/2$^+$), band assignment. configuration: $\nu h^1_{11/2}$.
1220.9@ *7*	(11/2$^+$)		D	J$^\pi$: 682.9γ to (7/2$^+$); band assignment.
1351.9a *4*	(13/2$^+$)		BCD	J$^\pi$: 661.7γ E2 to (9/2$^+$); band assignment.
1531.7& *4*	(15/2$^+$)		BCD	J$^\pi$: 760.2γ E2 to (11/2$^+$); band assignment.
1583.50b *17*	(15/2$^-$)	9.7 ps *10*	BCD	J$^\pi$: 494.3γ E2 to (11/2$^-$); band assignment.
1936.0@ *9*	(15/2$^+$)		D	J$^\pi$: 715.1γ to (11/2$^+$); band assignment.
1950.4c *5*	(13/2$^-$)		D	J$^\pi$: 861γ to (11/2$^-$), 1179γ to (11/2$^+$); band assignment.
2192.55b *20*	(19/2$^-$)	3.8 ps *9*	BCD	J$^\pi$: 609.0γ E2 to (15/2$^-$); band assignment.
2385.3& *4*	(19/2$^+$)		BCD	J$^\pi$: 853.7 E2 to (15/2$^+$); band assignment.
2497.5c *4*	(17/2$^-$)		D	J$^\pi$: 304γ to (19/2$^-$), 547.0γ to (13/2$^-$); band assignment.
2887.80b *22*	(23/2$^-$)		BCD	J$^\pi$: 695.2γ E2 to (19/2$^-$); band assignment.
2927.6@ *11*	(19/2$^+$)		D	J$^\pi$: 991.5γ to (15/2$^+$); band assignment.
3160.3c *5*	(21/2$^-$)		D	J$^\pi$: 663.3γ E2 to (17/2$^-$); band assignment.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{109}Te Levels (continued)

E(level)[†]	J$^\pi$[‡]	XREF	Comments
3427.2[&] 5	(23/2$^+$)	B D	J$^\pi$: 1042.1γ E2 to (19/2$^+$); band assignment.
3777.30[b] 24	(27/2$^-$)	BCD	J$^\pi$: 889.5γ E2 to (23/2$^-$); band assignment.
3957.3[c] 6	(25/2$^-$)	D	J$^\pi$: 796.2γ to (21/2$^-$); band assignment.
4462.4[&] 7	(27/2$^+$)	B D	J$^\pi$: 1035.3γ to (23/2$^+$); band assignment.
4673.2[d] 3	(29/2$^+$)	BCD	J$^\pi$: 895.9γ (E1) to (27/2$^-$); band assignment.
4711.2[b] 3	(31/2$^-$)	BCD	J$^\pi$: 933.9γ E2 to (27/2$^-$); band assignment.
4844.1[c] 8	(29/2$^-$)	D	J$^\pi$: 886.7γ to (25/2$^-$); band assignment.
4963.0?		D	
5198.3 7		D	
5511.2 9		D	
5550.6[d] 3	(33/2$^+$)	BCD	J$^\pi$: 877.3γ E2 to (29/2$^+$), 839.5γ (E1) to (31/2$^-$); band assignment.
5614.0[&] 10	(31/2$^+$)	D	J$^\pi$: 1151.6γ to (27/2$^+$); band assignment.
5727.0[b] 3	(35/2$^-$)	BCD	J$^\pi$: 1015.8γ E2 to (31/2$^-$); band assignment.
5793.1[c] 10	(33/2$^-$)	D	J$^\pi$: 949.0γ to (29/2$^-$); band assignment.
5901.1 11		D	
6353.6 13		D	
6399.2[d] 4	(37/2$^+$)	BCD	J$^\pi$: 672.1γ (E1) to (35/2$^-$), 848.7γ E2 to (33/2$^+$), band assignment.
6756.3[b] 5	(39/2$^-$)	BCD	J$^\pi$: 1029.4γ E2 to (35/2$^-$); band assignment.
6801.2[c] 12	(37/2$^-$)	D	J$^\pi$: 1008.1γ to (33/2$^-$); band assignment.
7388.5[d] 4	(41/2$^+$)	CD	J$^\pi$: 632.6γ (E1) to (39/2$^-$), 989.2γ E2 to (37/2$^+$); band assignment.
7990.3[b] 11	(43/2$^-$)	CD	J$^\pi$: 1234γ (E2) to (39/2$^-$); band assignment.
8106.0?[c]	(41/2$^-$)	D	J$^\pi$: 1308γ to (37/2$^-$); band assignment.
8362.5[d] 5	(45/2$^+$)	CD	J$^\pi$: 974.0γ E2 to (41/2$^+$); band assignment.
9217.3[b] 15	(47/2$^-$)	D	J$^\pi$: 1227γ (E2) to (43/2$^-$); band assignment.
9411[d]	(49/2$^+$)	D	J$^\pi$: 1048γ to (45/2$^+$); band assignment.
9650.4[e] 8	(49/2$^+$)	D	J$^\pi$: 1287.9γ to (45/2$^+$); band assignment.
10881.4[e] 13	(53/2$^+$)	D	J$^\pi$: 1231γ (E2) to (49/2$^+$); band assignment.
12257.4[e] 16	(57/2$^+$)	D	J$^\pi$: 1376γ to (53/2$^+$); band assignment.
13751.4?[e] 21	(61/2$^+$)	D	J$^\pi$: 1493γ to (57/2$^+$); band assignment.

[†] From a least-squares fit to Eγ.

[‡] From deduced γ-ray transition multipolarities based on measured DCO ratios and $\gamma(\theta)$ and the observed band structures, unless otherwise stated.

[#] From 2012Pr10 in ^{58}Ni(^{54}Fe,2pnγ) using the RDDS method, unless otherwise stated.

[@] Band(A): Band based on the J^π=5/2$^+$ ($d_{5/2}$) ground state.

[&] Band(B): Band based on the J^π=7/2$^+$ ($g_{7/2}$) state at 98 keV.

[a] Band(C): Band based on the J^π=5/2$^+$ state 265 keV.

[b] Band(D): Band based on the J^π=11/2$^-$ ($h_{11/2}$) state at 1090 keV.

[c] Band(E): Band based on the J^π=(13/2$^-$) state at 1951 keV.

[d] Band(F): Band based on the J^π=29/2$^+$ state at 4675 keV.

[e] Band(G): Band based on the J^π=(49/2$^+$) state at 9651 keV.

Adopted Levels, Gammas (continued)

γ(^{109}Te)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[#&]	α[@]	Comments
98.12	(7/2$^+$)	98.1 *1*	100	0.0	(5/2$^+$)	M1(+E2)	≤+0.09	0.723 *12*	α(K)=0.621 *10*; α(L)=0.0818 *19*; α(M)=0.0164 *4* α(N)=0.00323 *8*; α(O)=0.000348 *7* E_γ: from ^{54}Fe(^{58}Ni,2pnγ) (1995Do13). Mult.: A_2/A_0=−0.25 *8*, A_4/A_0=−0.00 *9* (2000Bo29), R(DCO)=0.90 *10* (2000Bo29), R=0.99 *13* (1995Do13), DCO=0.7 *1* (1995Pa01).
265.4	(5/2$^+$)	265.4 *3*	100	0.0	(5/2$^+$)	(M1+E2)		0.0470	α(K)=0.0406 *6*; α(L)=0.00514 *8*; α(M)=0.001026 *15* α(N)=0.000203 *3*; α(O)=2.21×10^{-5} *4* E_γ: weighted average of 265.5 *3* from 2000Bo29, 265.0 *6* from 2012Pr10, and 265.2 *5* from 1995Do13. Mult.: R(DCO)=0.71 *6* (2000Bo29).
538.04	(7/2$^+$)	538.2 *3*	100	0.0	(5/2$^+$)	M1(+E2)	−0.09 *9*	0.00784 *12*	α(K)=0.00680 *10*; α(L)=0.000842 *12*; α(M)=0.0001675 *24* α(N)=3.32×10^{-5} *5*; α(O)=3.62×10^{-6} *6* E_γ: weighted average of 538.5 *3* from 2000Bo29, 538.0 *6* from 2012Pr10, and 537.6 *5* from 1995Do13. Mult.: A_2/A_0=−0.43 *13*, (A_4/A_0 set to 0.0) (2000Bo29); R(DCO)=0.80 *6* (2000Bo29), DCO≈0.5 (1998De44).
690.23	(9/2$^+$)	152.5 *5*	<3	538.04	(7/2$^+$)	[M1]		0.209 *4*	α(K)=0.180 *3*; α(L)=0.0232 *4*; α(M)=0.00463 *8* α(N)=0.000915 *16*; α(O)=9.92×10^{-5} *17* B(M1)(W.u.)=0.003 *3* E_γ: weighted average of 152.5 *6* from 2000Bo29 and 152.4 *6* from 2012Pr10.
		424.8 *6*	29 *3*	265.4	(5/2$^+$)	E2		0.01307	α(K)=0.01107 *17*; α(L)=0.001611 *24*; α(M)=0.000324 *5* α(N)=6.32×10^{-5} *10*; α(O)=6.46×10^{-6} *10* B(E2)(W.u.)=12 *3* Mult.: A_2/A_0=+0.17 *12*, A_4/A_0=−0.02 *15* (2000Bo29); R(DCO)=0.97 *5* (2000Bo29).
		592.0 *1*	100 *5*	98.12	(7/2$^+$)	M1+E2	+0.102 *23*	0.00622	α(K)=0.00540 *8*; α(L)=0.000666 *10*; α(M)=0.0001325 *19* α(N)=2.62×10^{-5} *4*; α(O)=2.87×10^{-6} *4* B(M1)(W.u.)=0.0033 *8*; B(E2)(W.u.)=0.08 *4* E_γ: weighted average of 592.1 *3* from 2000Bo29, 592.4 *3* from 2012Pr10, and 591.9 *1* from 1995Do13. Mult.: A_2/A_0=−0.10 *4*, (A_4/A_0 set to 0.0) (2000Bo29); R(DCO)=0.69 *3* (2000Bo29), R=0.94 *17* (1995Do13), DCO=1.0 *1* (1995Pa01), DCO≈0.8 (1998De44).
763.10	(9/2$^+$)	74 *1*	<2.3	690.23	(9/2$^+$)	[M1]		1.61 *7*	α(K)=1.39 *6*; α(L)=0.181 *8*; α(M)=0.0361 *16* α(N)=0.0071 *3*; α(O)=0.00077 *4* B(M1)(W.u.)=0.15 *+18−15*
		225.1 *3*	30.0 *16*	538.04	(7/2$^+$)	M1+E2		0.0727	α(K)=0.0627 *9*; α(L)=0.00799 *12*; α(M)=0.001593 *23* α(N)=0.000315 *5*; α(O)=3.43×10^{-5} *5* E_γ: weighted average of 225.3 *3* from 2000Bo29, 225.0 *6* from

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Adopted Levels, Gammas (continued)

γ(^{109}Te) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.‡	α@	Comments
								2012Pr10, and 224.6 *5* from 1995Do13. Mult.: R(DCO)=0.75 *4* (2000Bo29), DCO=0.6 *1* (1995Pa01), DCO≈0.6 (1998De44).
763.10	(9/2$^+$)	665.8 *6*	<2.3	98.12	(7/2$^+$)	M1+E2	0.00471	α(K)=0.00408 *6*; α(L)=0.000502 *8*; α(M)=9.97×10^{-5} *15* α(N)=1.98×10^{-5} *3*; α(O)=2.16×10^{-6} *3* Mult.: DCO≈0.7 (1998De44).
		763.1 *2*	100 *5*	0.0	(5/2$^+$)	E2	0.00270	α(K)=0.00232 *4*; α(L)=0.000301 *5*; α(M)=6.01×10^{-5} *9* α(N)=1.183×10^{-5} *17*; α(O)=1.260×10^{-6} *18* B(E2)(W.u.)=17 *11* E_γ: weighted average of 763.2 *3* from 2000Bo29, 763.0 *3* from 2012Pr10, and 763.0 *3* from 1995Do13. Mult.: A_2/A_0=+0.28 *4*, (A_4/A_0 set to 0.0) (for 760.3+763.2γ) (2000Bo29); R(DCO)=0.88 *3* (2000Bo29), R=1.51 *25* (1995Do13), DCO=1.2 *1* (1995Pa01), DCO≈1.1 (1998De44).
772.00	(11/2$^+$)	674.5 *3*	100	98.12	(7/2$^+$)	E2	0.00366	α(K)=0.00315 *5*; α(L)=0.000416 *6*; α(M)=8.31×10^{-5} *12* α(N)=1.633×10^{-5} *23*; α(O)=1.727×10^{-6} *25* E_γ: weighted average of 674.5 *3* from 2000Bo29, 675.0 *3* from 2012Pr10, and 674.2 *2* from 1995Do13. Mult.: R(DCO)=0.88 *7* (for 672.2γ+674.5γ) (2000Bo29), R=1.6 *3* (1995Do13), DCO≈1.1 (1998De44).
1089.14	(11/2$^-$)	317.2 *3*	27.5 *13*	772.00	(11/2$^+$)	(E1)	0.00818	α(K)=0.00709 *10*; α(L)=0.000874 *13*; α(M)=0.0001734 *25* α(N)=3.41×10^{-5} *5*; α(O)=3.64×10^{-6} *6* B(E1)(W.u.)=1.72×10^{-5} *12* E_γ: others: 317.0 *3* (2012Pr10), 316.2 *2* (1995Do13). Mult.: A_2/A_0=+0.33 *11*, (A_4/A_0 set to 0.0) (2000Bo29); R(DCO)=1.02 *8* (2000Bo29), DCO≈0.5 (1998De44). R=1.7 *7* from 1995Do13.
		326.2 *2*	93 *5*	763.10	(9/2$^+$)	(E1)	0.00761	α(K)=0.00660 *10*; α(L)=0.000813 *12*; α(M)=0.0001612 *23* α(N)=3.17×10^{-5} *5*; α(O)=3.39×10^{-6} *5* B(E1)(W.u.)=5.3×10^{-5} *4* E_γ: weighted average of 326.5 *3* from 2000Bo29, 326.0 *3* from 2012Pr10, and 326.1 *2* from 1995Do13. Mult.: A_2/A_0=+0.21 *3*, A_4/A_0=−0.05 *3*, R(DCO)=0.61 *3*, δ(Q/D)=0.03 *4* (2000Bo29); A_2/A_0=−0.33 *6*, δ(Q/D)=0, DCO≈0.6 (1998De44); R=0.75 *10* (1995Do13), DCO=0.6 *1* (1995Pa01).
		398.8 *1*	100 *5*	690.23	(9/2$^+$)	(E1)	0.00458	α(K)=0.00397 *6*; α(L)=0.000486 *7*; α(M)=9.64×10^{-5} *14* α(N)=1.90×10^{-5} *3*; α(O)=2.04×10^{-6} *3* B(E1)(W.u.)=3.14×10^{-5} *22* E_γ: weighted average of 399.2 *3* from 2000Bo29, 399.0 *3* from 2012Pr10, and 398.7 *1* from 1995Do13. Mult.: A_2/A_0=−0.23 *3*, A_4/A_0=+0.01 *4*, δ(Q/D)=−0.025 *25*, R(DCO)=0.64 *3* (2000Bo29); R=0.80 *12* (1995Do13), DCO≈0.5 (1998De44).
1220.9	(11/2$^+$)	682.9 *6*	100	538.04	(7/2$^+$)			
1351.9	(13/2$^+$)	580.0 *6*	<23	772.00	(11/2$^+$)			E_γ: other: 580.6 *6* (2012Pr10). Mult.: DCO AP 1.0 from 1998De44 could indicate E2 character.

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Adopted Levels, Gammas (continued)

γ(^{109}Te) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[@]	Comments
1351.9	(13/2$^+$)	661.7 *4*	100 *9*	690.23	(9/2$^+$)	E2	0.00385	α(K)=0.00330 *5*; α(L)=0.000438 *7*; α(M)=8.75×10^{-5} *13* α(N)=1.719×10^{-5} *25*; α(O)=1.82×10^{-6} *3* E_γ: weighted average of 661.3 *6* from 2000Bo29 and 662.0 *6* from 2012Pr10, Mult.: R(DCO)=0.98 *8* (2000Bo29).
1531.7	(15/2$^+$)	760.2 *3*	100	772.00	(11/2$^+$)	E2	0.00272	α(K)=0.00235 *4*; α(L)=0.000304 *5*; α(M)=6.07×10^{-5} *9* α(N)=1.195×10^{-5} *17*; α(O)=1.272×10^{-6} *18* E_γ: weighted average of 760.3 *6* from 2000Bo29, 760.3 *6* from 2012Pr10, and 760.1 *3* from 1995Do13. Mult.: A_2/A_0=+0.28 *4*, (A_4/A_0 set to 0.0)(for 760.3γ+763.2γ), R(DCO)=0.88 *3* (2000Bo29); R=1.4 *4* (1995Do13).
1583.50	(15/2$^-$)	232 *1*	<1	1351.9	(13/2$^+$)	[E1]	0.0188 *4*	α(K)=0.0163 *3*; α(L)=0.00203 *4*; α(M)=0.000402 *8* α(N)=7.88×10^{-5} *15*; α(O)=8.35×10^{-6} *16* B(E1)(W.u.)=1.2×10^{-5} *+13−12*
		494.3 *1*	100	1089.14	(11/2$^-$)	E2	0.00843	α(K)=0.00717 *10*; α(L)=0.001007 *15*; α(M)=0.000202 *3* α(N)=3.95×10^{-5} *6*; α(O)=4.09×10^{-6} *6* B(E2)(W.u.)=63 *7* E_γ: weighted average of 494.5 *3* from 2000Bo29, 494.4 *3* from 2012Pr10, and 494.3 *1* from 1995Do13. Mult.: A_2/A_0=+0.283 *21*, A_4/A_0=+0.003 *26*, R(DCO)=1.10 *4* (2000Bo29); R=1.47 *22* (1995Do13), DCO =1.1 *1* (1995Pa01), DCO≈1.0 (1998De44).
1936.0	(15/2$^+$)	715.1 *6*	100	1220.9	(11/2$^+$)			
1950.4	(13/2$^-$)	861.0 *6*		1089.14	(11/2$^-$)			
		1179 *1*		772.00	(11/2$^+$)			
2192.55	(19/2$^-$)	609.0 *1*	100	1583.50	(15/2$^-$)	E2	0.00477	α(K)=0.00408 *6*; α(L)=0.000549 *8*; α(M)=0.0001100 *16* α(N)=2.16×10^{-5} *3*; α(O)=2.27×10^{-6} *4* B(E2)(W.u.)=56 *13* E_γ: weighted average of 609.1 *3* from 2000Bo29, 609.0 *3* from 2012Pr10, and 609.0 *1* from 1995Do13. Mult.: A_2/A_0=+0.331 *21*, A_4/A_0=0.108 *25*, R(DCO)=1.02 *3* (2000Bo29); R=1.57 *19* (1995Do13), DCO=1.1 *1* (1995Pa01), DCO≈1 (1998De44).
2385.3	(19/2$^+$)	853.7 *2*	100	1531.7	(15/2$^+$)	E2	0.00207	α(K)=0.00178 *3*; α(L)=0.000228 *4*; α(M)=4.54×10^{-5} *7* α(N)=8.95×10^{-6} *13*; α(O)=9.59×10^{-7} *14* E_γ: weighted average of 853.8 *3* from 2000Bo29, 853.8 *3* from 2012Pr10, and 853.3 *5* from 1995Do13. Mult.: R(DCO)=0.90 *7* (for 848.8γ+853.8γ) (2000Bo29); R=1.5 *5* (1995Do13).
2497.5	(17/2$^-$)	304 *1*		2192.55	(19/2$^-$)			
		547.0 *6*		1950.4	(13/2$^-$)			
		966.0 *3*		1531.7	(15/2$^+$)			
2887.80	(23/2$^-$)	695.2 *1*	100	2192.55	(19/2$^-$)	E2	0.00339	α(K)=0.00292 *4*; α(L)=0.000384 *6*; α(M)=7.67×10^{-5} *11* α(N)=1.507×10^{-5} *22*; α(O)=1.597×10^{-6} *23* E_γ: weighted average of 695.2 *3* from 2000Bo29, 695.0 *3* from 2012Pr10, and 695.2 *1* from 1995Do13. Mult.: A_2/A_0=+0.330 *22*, A_4/A_0=0.01 *3* R(DCO)=1.00 *3* (2000Bo29); R=1.57 *20* (1995Do13), DCO= 1.2 *1* (1995Pa01), DCO≈1.0 (1998De44).

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Adopted Levels, Gammas (continued)

γ(^{109}Te) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ‡	α @	Comments
2927.6	(19/2$^+$)	991.5 *6*	100	1936.0	(15/2$^+$)			
3160.3	(21/2$^-$)	271.0 *6*	<14	2887.80	(23/2$^-$)			
		663.3 *6*	100 *10*	2497.5	(17/2$^-$)	E2	0.00382	α(K)=0.00328 *5*; α(L)=0.000435 *7*; α(M)=8.69×10^{-5} *13* α(N)=1.707×10^{-5} *25*; α(O)=1.80×10^{-6} *3* Mult.: R(DCO)=1.03 *7* (2000Bo29).
		775.3 *6*	38 *4*	2385.3	(19/2$^+$)			
3427.2	(23/2$^+$)	1042.1 *3*	100	2385.3	(19/2$^+$)	E2	1.32×10^{-3}	α(K)=0.001144 *16*; α(L)=0.0001429 *20*; α(M)=2.84×10^{-5} *4* α(N)=5.61×10^{-6} *8*; α(O)=6.05×10^{-7} *9* E_γ: other: 1042.6 *6* (2012Pr10). Mult.: R(DCO)=0.98 *6* (2000Bo29).
3777.30	(27/2$^-$)	889.5 *1*	100	2887.80	(23/2$^-$)	E2	0.00188	α(K)=0.001625 *23*; α(L)=0.000207 *3*; α(M)=4.11×10^{-5} *6* α(N)=8.11×10^{-6} *12*; α(O)=8.70×10^{-7} *13* E_γ: weighted average of 889.6 *3* from 2000Bo29, 889.6 *3* from 2012Pr10, and 889.5 *1* from 1995Do13. Mult.: A_2/A_0=+0.38 *3*, (A_4/A_0 set to 0.0), R(DCO)=1.01 *5* (2000Bo29); R=1.47 *19* (1995Do13), DCO = 1.0 *1* (1995Pa01), DCO≈0.9 (1998De44).
3957.3	(25/2$^-$)	530.7 *6*	<19	3427.2	(23/2$^+$)			
		796.2 *6*	100 *10*	3160.3	(21/2$^-$)			
4462.4	(27/2$^+$)	1035.3 *6*	100	3427.2	(23/2$^+$)			
4673.2	(29/2$^+$)	895.9 *1*	100	3777.30	(27/2$^-$)	(E1)	7.57×10^{-4}	α(K)=0.000660 *10*; α(L)=7.88×10^{-5} *11*; α(M)=1.560×10^{-5} *22* α(N)=3.08×10^{-6} *5*; α(O)=3.36×10^{-7} *5* E_γ: weighted average of 895.7 *3* from 2000Bo29, 895.9 *3* from 2012Pr10, and 895.9 *1* from 1995Do13. Mult.: A_2/A_0=−0.31 *7*, (A_4/A_0 set to 0.0), δ(Q/D)=−0.04 *5*, R(DCO)=0.62 *8* (2000Bo29); A_2/A_0=−0.25 *4*, DCO≈0.5 (1998De44); R=1.0 *4* (1995Do13).
4711.2	(31/2$^-$)	933.9 *1*	100	3777.30	(27/2$^-$)	E2	1.68×10^{-3}	α(K)=0.001456 *21*; α(L)=0.000184 *3*; α(M)=3.66×10^{-5} *6* α(N)=7.22×10^{-6} *11*; α(O)=7.76×10^{-7} *11* E_γ: weighted average of 933.7 *3* from 2000Bo29, 933.7 *3* from 2012Pr10, and 933.9 *1* from 1995Do13. Mult.: A_2/A_0=+0.35 *4*, A_4/A_0=+0.09 *5*, R(DCO)=1.01 *4* (2000Bo29); R=1.60 *24* (1995Do13), DCO=1.1 *1* (1995Pa01), DCO≈1.0 (1998De44).
4844.1	(29/2$^-$)	382 *1*	<33	4462.4	(27/2$^+$)			
		886.7 *6*	100 *10*	3957.3	(25/2$^-$)			
5198.3		234.9[a] *6*	<59	4963.0?				
		1421.0 *6*	100 *10*	3777.30	(27/2$^-$)			
5511.2		312.9 *6*	100	5198.3				
5550.6	(33/2$^+$)	839.5 *3*	59 *6*	4711.2	(31/2$^-$)	(E1)	8.62×10^{-4}	α(K)=0.000750 *11*; α(L)=8.98×10^{-5} *13*; α(M)=1.778×10^{-5} *25* α(N)=3.51×10^{-6} *5*; α(O)=3.82×10^{-7} *6* E_γ: weighted average of 839.6 *6* from 2000Bo29, 839.9 *6* from

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Adopted Levels, Gammas (continued)

$\gamma(^{109}Te)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[@]	Comments
								2012Pr10, and 839.3 *3* from 1995Do13. Mult.: A_2/A_0=−0.42 *16*, A_4/A_0=+0.17 *20*, δ(Q/D)=−0.11 *12*, R(DCO)=0.87 *7* (2000Bo29); A_2/A_0=−0.26 *9*, DCO≈0.5 (1998De44); R=0.84 *23* (1995Do13).
5550.6	(33/2$^+$)	877.3 *2*	100 *5*	4673.2	(29/2$^+$)	E2	0.00194	α(K)=0.001677 *24*; α(L)=0.000213 *3*; α(M)=4.25×10^{-5} *6* α(N)=8.38×10^{-6} *12*; α(O)=8.98×10^{-7} *13* E_γ: weighted average of 877.4 *3* from 2000Bo29, 877.3 *3* from 2012Pr10, and 877.0 *4* from 1995Do13. Mult.: A_2/A_0=+0.26 *8*, A_4/A_0=+0.11 *10*, R(DCO)=0.89 *6* (2000Bo29); A_2/A_0=+0.39 *8*, A_4=−0.14 *3*, DCO≈0.9 (1998De44); R=1.6 *5* (1995Do13).
5614.0	(31/2$^+$)	1151.6 *6*	100	4462.4	(27/2$^+$)			
5727.0	(35/2$^-$)	1015.8 *2*	100	4711.2	(31/2$^-$)	E2	1.40×10^{-3}	α(K)=0.001209 *17*; α(L)=0.0001515 *22*; α(M)=3.01×10^{-5} *5* α(N)=5.95×10^{-6} *9*; α(O)=6.41×10^{-7} *9* E_γ: weighted average of 1015.8 *3* from 2000Bo29, 1015.7 *3* from 2012Pr10, and 1015.9 *2* from 1995Do13. Mult.: A_2/A_0=+0.18 *5*, A_4/A_0=−0.08 *6*, R(DCO)=0.96 *5* (2000Bo29); R=1.9 *4* (1995Do13).
5793.1	(33/2$^-$)	949.0 *6*	100	4844.1	(29/2$^-$)			
5901.1		389.9 *6*	100	5511.2				
6353.6		452.5 *6*	100	5901.1				
6399.2	(37/2$^+$)	672.1 *3*	22 *2*	5727.0	(35/2$^-$)	(E1)	1.37×10^{-3}	α(K)=0.001189 *17*; α(L)=0.0001433 *21*; α(M)=2.84×10^{-5} *4* α(N)=5.60×10^{-6} *8*; α(O)=6.08×10^{-7} *9* E_γ: weighted average of 672.2 *6* from 2000Bo29, 672.2 *6* from 2012Pr10, and 672.0 *4* from 1995Do13. Mult.: A_2/A_0=−0.27 *8*, DCO≈0.5 (1998De44); R(DCO)=0.88 *7* (for 672.2γ+674.5γ) (2000Bo29), R=1.2 *5* (1995Do13).
		848.7 *2*	100 *10*	5550.6	(33/2$^+$)	E2	0.00210	α(K)=0.00181 *3*; α(L)=0.000231 *4*; α(M)=4.61×10^{-5} *7* α(N)=9.08×10^{-6} *13*; α(O)=9.72×10^{-7} *14* E_γ: weighted average of 848.8 *3* from 2000Bo29, 848.5 *6* from 2012Pr10, and 848.7 *2* from 1995Do13. Mult.: A_2/A_0=+0.38 *8*, A_4/A_0=−0.14 *3*, DCO≈1.1 (1998De44); R(DCO)=0.90 *7* (for 848.8γ+853.8γ) (2000Bo29), R=1.5 *4* (1995Do13).
6756.3	(39/2$^-$)	1029.4 *4*	100	5727.0	(35/2$^-$)	E2	1.36×10^{-3}	α(K)=0.001175 *17*; α(L)=0.0001470 *21*; α(M)=2.92×10^{-5} *5* α(N)=5.77×10^{-6} *8*; α(O)=6.22×10^{-7} *9* E_γ: weighted average of 1029.2 *6* from 2000Bo29, 1029.4 *6* from 2012Pr10, and 1029.5 *5* from 1995Do13. Mult.: R(DCO)=1.19 *13* (2000Bo29), R=1.0 *4* (1995Do13), DCO≈1.0 (1998De44).
6801.2	(37/2$^-$)	1008.1 *6*	100	5793.1	(33/2$^-$)			
7388.5	(41/2$^+$)	632.6 *6*	11 *1*	6756.3	(39/2$^-$)	(E1)	1.56×10^{-3}	α(K)=0.001355 *20*; α(L)=0.0001636 *24*; α(M)=3.24×10^{-5} *5* α(N)=6.40×10^{-6} *9*; α(O)=6.93×10^{-7} *10* Mult.: A_2/A_0=−0.27 *5*, DCO≈0.6 (1998De44), R(DCO)=0.58 *8* (2000Bo29).

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Adopted Levels, Gammas (continued)

γ(^{109}Te) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[@]	Comments
7388.5	(41/2$^+$)	989.2 *2*	100 *5*	6399.2	(37/2$^+$)	E2	1.48×10^{-3}	α(K)=0.001281 *18*; α(L)=0.0001609 *23*; α(M)=3.20×10^{-5} *5* α(N)=6.32×10^{-6} *9*; α(O)=6.80×10^{-7} *10* E_γ: weighted average of 989.4 *3* from 2000Bo29 and 989.0 *3* from 1995Do13. Mult.: A_2/A_0=+0.21 *6*, (A_4/A_0 set to 0.0), R(DCO)=0.93 *6* (2000Bo29); R=1.2 *4* (1995Do13), DCO≈1.0 (1998De44).
7990.3	(43/2$^-$)	1234 *1*	100	6756.3	(39/2$^-$)	(E2)	9.36×10^{-4}	α(K)=0.000802 *12*; α(L)=9.87×10^{-5} *14*; α(M)=1.96×10^{-5} *3* α(N)=3.87×10^{-6} *6*; α(O)=4.20×10^{-7} *6*; α(IPF)=1.131×10^{-5} *22* Mult.: R(DCO)=1.20 *9* for the composite peak of 1227+1231+1234 (2000Bo29).
8106.0?	(41/2$^-$)	1308[a] *1*	100	6801.2	(37/2$^-$)			
8362.5	(45/2$^+$)	974.0 *3*	100	7388.5	(41/2$^+$)	E2	1.53×10^{-3}	α(K)=0.001326 *19*; α(L)=0.0001668 *24*; α(M)=3.32×10^{-5} *5* α(N)=6.55×10^{-6} *10*; α(O)=7.05×10^{-7} *10* E_γ: weighted average of 973.4 *6* from 2000Bo29 and 974.2 *3* from 1995Do13. Mult.: A_2/A_0=+0.51 *12*, (A_4/A_0 set to 0.0),R(DCO)=0.93 *6* (2000Bo29); R=1.0 *4* (1995Do13), DCO≈1.0 (1998De44).
9217.3	(47/2$^-$)	1227 *1*	100	7990.3	(43/2$^-$)	(E2)	9.46×10^{-4}	α(K)=0.000811 *12*; α(L)=9.99×10^{-5} *14*; α(M)=1.98×10^{-5} *3* α(N)=3.92×10^{-6} *6*; α(O)=4.25×10^{-7} *6*; α(IPF)=1.029×10^{-5} *21* Mult.: R(DCO)=1.20 *9* the composite peak of 1227+1231+1234 (2000Bo29).
9411	(49/2$^+$)	1048[a] *1*	100	8362.5	(45/2$^+$)			
9650.4	(49/2$^+$)	1287.9 *6*	100	8362.5	(45/2$^+$)			
10881.4	(53/2$^+$)	1231 *1*	100	9650.4	(49/2$^+$)	(E2)	9.40×10^{-4}	α(K)=0.000806 *12*; α(L)=9.92×10^{-5} *14*; α(M)=1.97×10^{-5} *3* α(N)=3.89×10^{-6} *6*; α(O)=4.22×10^{-7} *6*; α(IPF)=1.087×10^{-5} *22* Mult.: R(DCO)=1.20 *9* the composite peak of 1227+1231+1234 (2000Bo29).
12257.4	(57/2$^+$)	1376 *1*	100	10881.4	(53/2$^+$)			
13751.4?	(61/2$^+$)	1493[a] *1*	100	12257.4	(57/2$^+$)			

[†] From ^{58}Ni(^{58}Ni,α2pnγ) (2000Bo29), unless otherwise stated.

[‡] Based on measured γ(θ) in 2000Bo29 (^{58}Ni(^{58}Ni,α2pnγ)) and 1998De44 (^{54}Fe(^{58}Ni,2pnγ)), R(DCO) in 2000Bo29 and intensity ratios R in 1995Do13 (^{54}Fe(^{58}Ni,2pnγ)), DCO ratios in 1995Pa01 and 1998De44 (^{54}Fe(^{58}Ni,2pnγ)). For R(DCO) the expected values are ≈1.0 for ΔJ=2, and ΔJ=0, dipole transitions, and ≈0.63 for ΔJ=1, dipole transitions (2000Bo29); intensity ratio R is expected to be 1.5 for stretched E2 transition and 0.8 for stretched dipole transitions (1995Do13); DCO values GE 1.0 indicate stretched quadrupole transitions, while values≈0.65 are expected for pure stretched dipole transitions (1995Pa01).

[#] From 2000Bo29 in ^{58}Ni(^{58}Ni,α2pnγ) using angular distribution data.

[@] Additional information 1.

[&] If No value given it was assumed δ=0.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.

[a] Placement of transition in the level scheme is uncertain.

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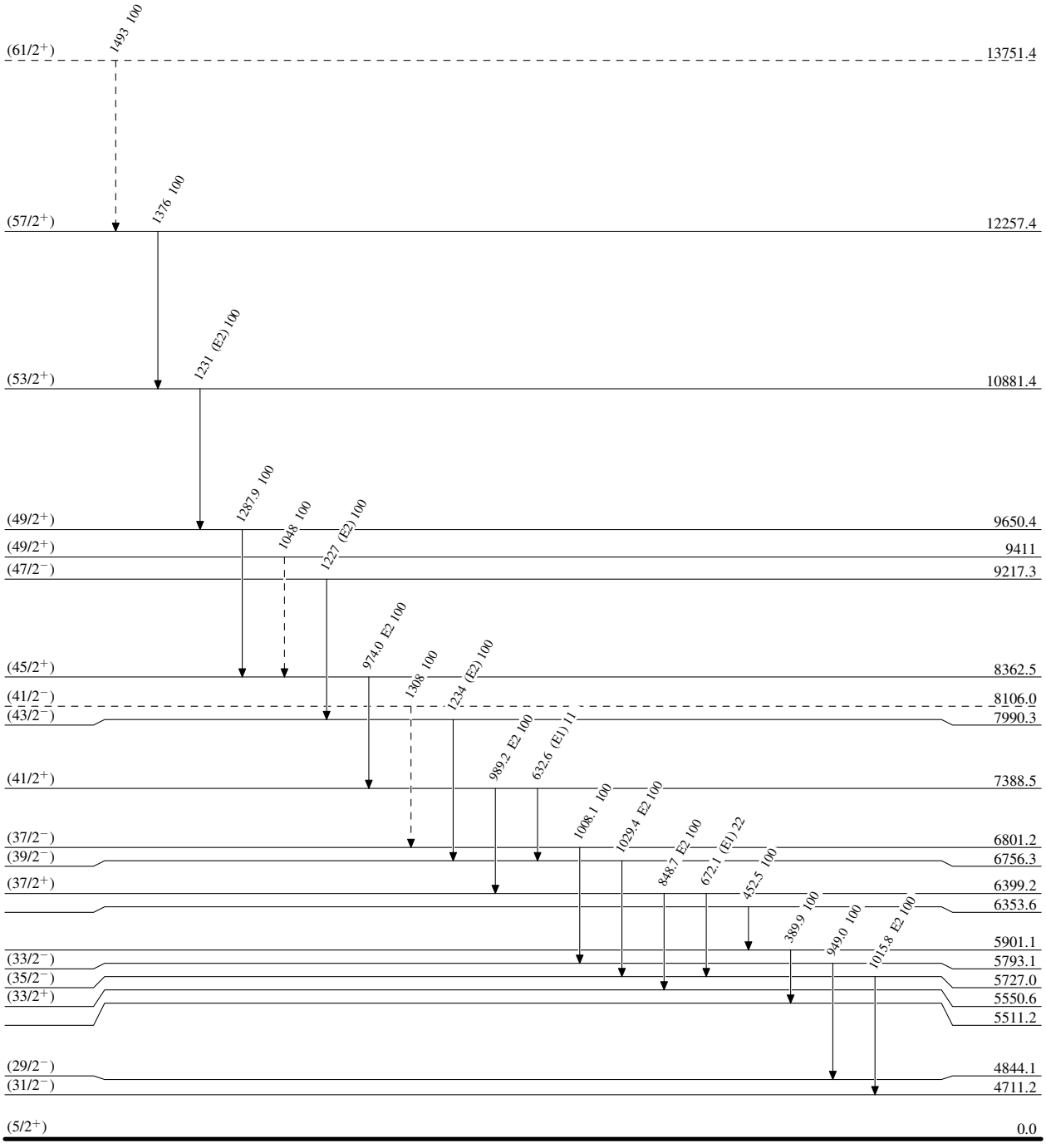
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



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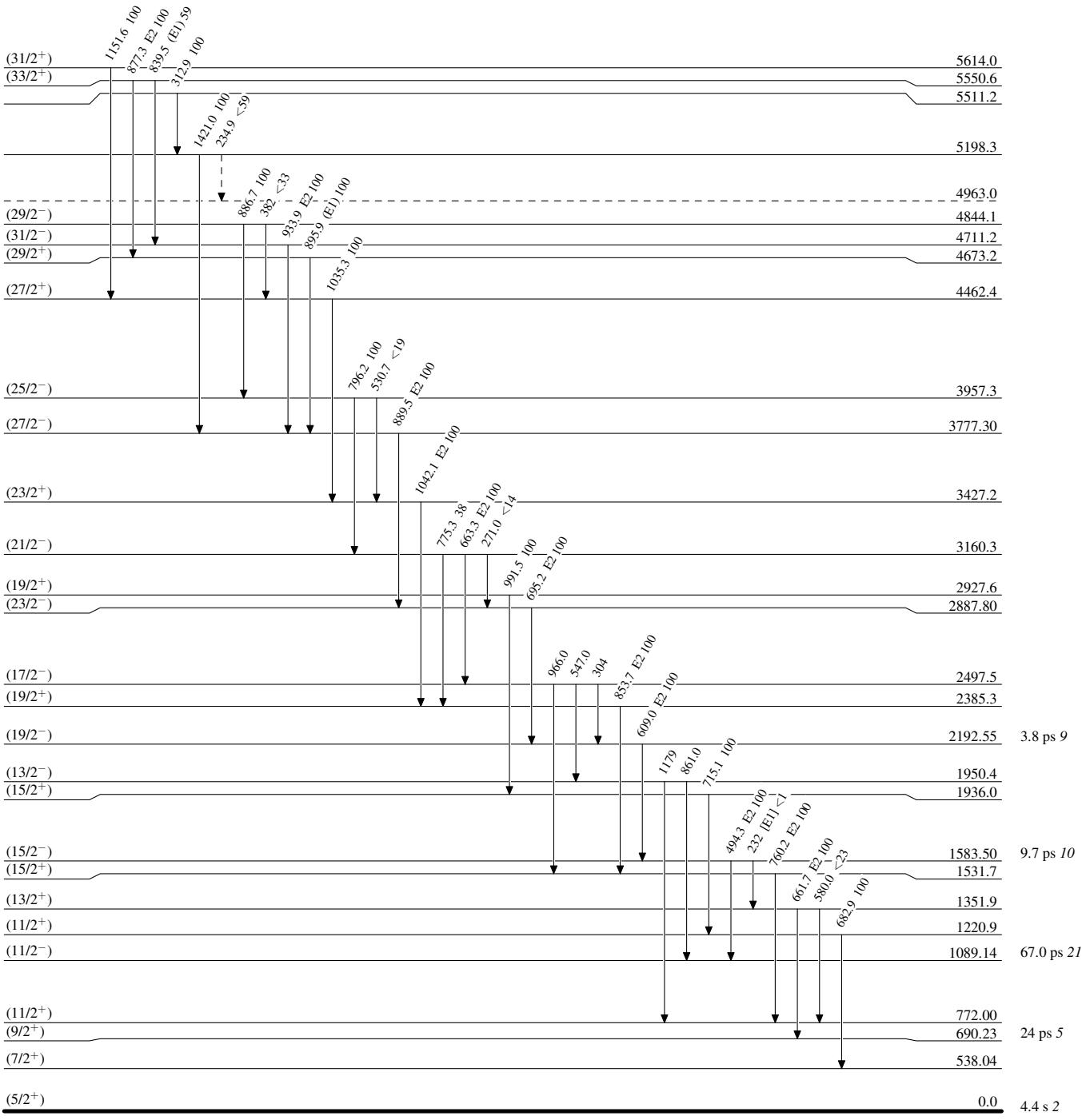
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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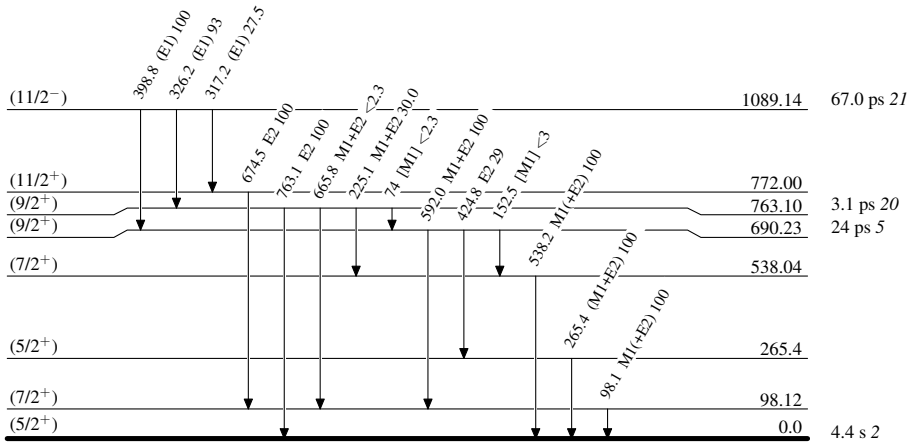
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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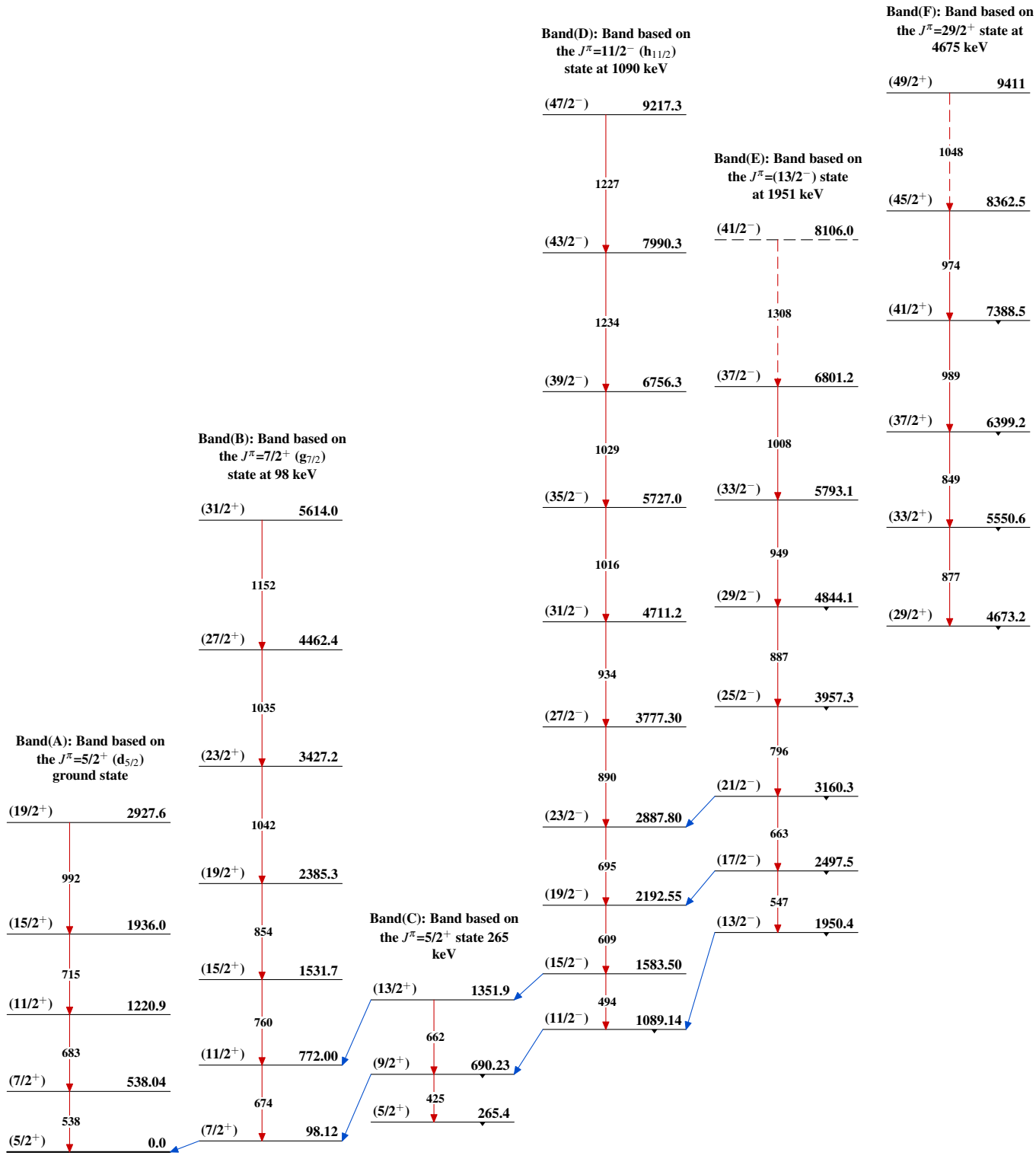
Adopted Levels, Gammas



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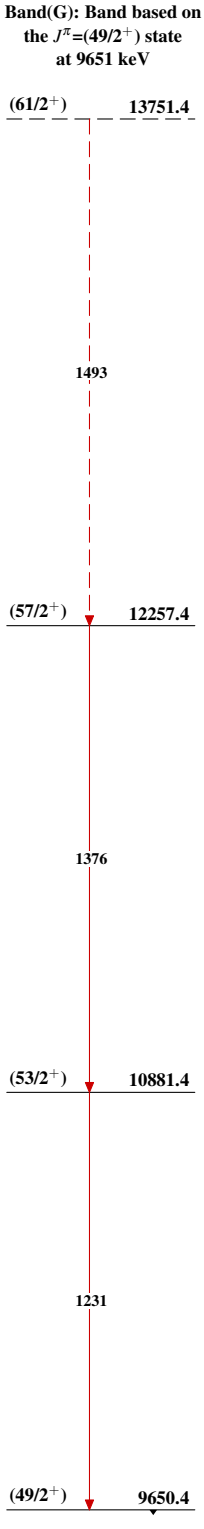
Adopted Levels, Gammas (continued)



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