Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

Q(β^-)=−1314 *4*; S(n)=8215 *11*; S(p)=4394 *4*; Q(α)=2401 *5* 2021Wa16
Q(ε)=695 *4*, S(2n)=15039 *4*, S(2p)=11977 *4* (2021Wa16).
^{149}Eu produced and identified by 1951Ho30, 1953Ma17 and 1959An36, followed by later studies of its decay.
Mass measurements (Penning-trap method): 2001Bo59, 2000Be42, 1997Be63.
Hyperfine structure and isotope shift measurements: 2000Tr07, 1997En08.
Additional information 1.
2018Qu01: theory: calculated low-energy levels, J^π, S(2n), B(E2), spectroscopic quadrupole moments, dominant configurations using microscopic core-quasiparticle coupling (CQC), and five-dimensional collective (5DCH) Hamiltonians, based on PC-PK1 energy density functional.
2017No07, 2016No13: theory: calculated single-particle energies, occupation probabilities of single-particle orbitals, levels, J^π, B(E2), B(M1), electric quadrupole and magnetic dipole moments using Interacting boson fermion model (IBFM).
1994Jo09: theory: analyzed high-spin levels, octupole correlations and strengths.
1988Al19: theory: calculated levels, magnetic dipole moment, quadrupole moment, B(E2), isotope shifts using interacting boson model.
1982Sc19: theory: calculated levels, B(l), magnetic dipole moment, quadrupole moments, spectroscopic factors using interacting boson-fermion model.
Other theoretical studies: consult the NSR database at www.nndc.bnl.gov/nsr/ for 17 references for structure and one for radioactive decay listed under 'document records' which can be accessed through web retrieval of the ENSDF database at www.nndc.bnl.gov/ensdf/.

^{149}Eu Levels

The high-spin sequences are discussed by 1994Ur01 in ^{139}La(^{13}C,3nγ) in terms of multi-particle states coupled to even-even core and to octupole-phonon vibrations. The octupole correlations for some of the bands are suggested by presence of interband E1 and E3 transitions.

Cross Reference (XREF) Flags

A	^{149}Gd ε decay (9.28 d)	E	^{148}Sm(^{3}He,d)	I	^{150}Sm(p,2nγ)
B	^{139}La(^{13}C,3nγ)	F	^{148}Sm(α,t)	J	^{150}Sm(d,3nγ)
C	^{145}Nd(^{7}Li,3nγ),^{146}Nd(^{6}Li,3nγ)	G	^{149}Sm(d,2nγ)	K	^{151}Eu(p,t)
D	^{148}Sm(p,p),(p,p′),(p,n) IAR	H	^{149}Sm(^{3}He,t) IAS	L	^{152}Sm(p,4nγ)

E(level)[†]	J^π[‡]	$T_{1/2}$	XREF	Comments
0.0[@]	5/2$^+$	93.1 d *4*	ABC EFG IJKL	%ε=100 μ=+3.565 *6* (1985Ah02,2019StZV) Q=+0.75 *2* (1985Ah02,2021StZZ) Evaluated rms charge radius=5.020 fm *10* (2013An02). Evaluated difference in charge radius: δ<r^2>(^{145}Eu,^{149}Eu)=+0.5338 fm^2 *1* (2013An02). J$^\pi$: spin from atomic beam (1972Ek05); parity from L(p,t)=0 from 5/2$^+$. $T_{1/2}$: from γ and x-ray decay curve (1970Ch09). Others: 93.1 d (1969Gu15); 93 d (D. Barr, Los Alamos Scientific Lab, priv. comm. to 1970Ch09); 90 d *20* (1962Dz02), 106 d *2* (1961Ha40), ≈120 d (1959An36), ≈120 d (1953Ma17). μ,Q: from collinear fast-beam laser spectroscopy (1985Ah02). Others: μ=+3.576 *10* (collinear fast-beam laser spectroscopy,1985Al06,1986Al33); 2.5 *5* (nuclear orientation,1983Kr19). Q=+0.716 *17* (hyperfine structure,1997En08); +0.70 *8* (collinear fast-beam laser spectroscopy,1985Al06,1986Al33).

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Adopted Levels, Gammas (continued)

^{149}Eu Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
				$\delta<r^2>(^{151}Eu,^{149}Eu)=-0.302$ fm^2 *21* (1985Al06, also 1983Al14, 1984Al35 and 1986Al33). See 1992He21 for systematics of root-mean square charge radii. Configuration=$\pi d_{5/2}$.
149.732[&] *5*	7/2+	0.32 ns *2*	ABC EFG IJKL	Jπ: M1+E2 γ to 5/2+; L(p,t)=4 from 5/2+. $T_{1/2}$: γ ce(t) (1962Be20).
458 *4*	1/2+		Ef	Jπ: L(^{3}He,d)=0; $\pi s_{1/2}$ state.
459.826 *8*	(3/2,5/2)+		A fG I L	Jπ: M1(+E2) γ to 5/2+; L(α,t)=(2).
496.389[#] *6*	11/2−	2.45 μs *5*	ABC EFG IJ L	μ=+7.0 *3* (1980Kl07,2020StZV) μ: differential PAD method (1980Kl07,1979Kl02). Other: +6.11 *17* (1970Kl07). 1980Kl07 (also 1979Kl02) used their experimentally determined paramagnetic correction, while 1970Kl07 used theoretical value from 1964GuZZ. Jπ: M2+E3 γ to 7/2+, E3 γ to 5/2+; L(^{3}He,d)=5. Configuration=$\pi h_{11/2}$. $T_{1/2}$: γγ(t) in ^{149}Gd ε (1970Kl07,1969Iv02,1962Pr06,1961Be08,1961So04).
534.296[@] *5*	7/2+		AB G IJKL	Jπ: M1(+E2) γ to 5/2+; E1 γ from 9/2−.
666.291[&] *6*	9/2+		ABC G IJKL	Jπ: M1 γ to 7/2+, E1+M2 γ from 9/2−; ΔJ=2, E2 γ to 5/2+.
691.8? *3*	(3/2,5/2,7/2)		I	Jπ: ΔJ=0,1 γ to (3/2,5/2)+. J=1/2 not allowed by observed anisotropy.
748.602 *6*	7/2−		A E G IJ L	Jπ: E1+M2 γ to 5/2+; E2 γ to 11/2−.
754 *3*	5/2+		K	Jπ: L(p,t)=0 from 5/2+.
767 *4*	1/2+		EF	Jπ: L(^{3}He,d)=0.
776.69 *10*	(3/2 to 9/2)		A K	Jπ: γ to 5/2+; weak ε feeding (log *ft*=10.1) from 7/2−.
795.030[a] *7*	9/2−		ABC G IJ L	Jπ: E1 γ to 7/2+ (149.7 level); M1+E2 γ to 11/2−.
798.934[@] *15*	(9/2+)		AB G IJKL	Jπ: ΔJ=1, (M1) γ to 7/2+; possible band member; (M2) assignment proposed by 1996Vy02 for 798.9γ is inconsistent.
812.631 *7*	5/2+		A EFG I KL	Jπ: M1(+E2) γ to 7/2+; L(^{3}He,d)=2.
875.939 *10*	5/2+		A EFG KL	Jπ: L(p,t)=0 from 5/2+.
910.88[&] *3*	11/2+		ABC G IJ L	Jπ: ΔJ=2, E2 γ to 7/2+; dipole γ to 9/2+.
913 *3*	3/2+,5/2+		E K	Jπ: L(^{3}He,d)=2.
933.120 *8*	(9/2)+		A G I kL	Jπ: E2 γ to 5/2+; (M1,E2) γ to 9/2+; (E1+M2) γ to 9/2−; γ to 11/2−.
935 *3*	(1/2+)		EF k	XREF: F(929). Jπ: L(^{3}He,d)=0.
938.609 *6*	7/2+		A G I kL	Jπ: M1+E2 γ to 5/2+; M1+E2 γ to 9/2+.
952.667 *18*	(3/2+ to 9/2+)		A	Jπ: γs to 5/2+ and 7/2+.
955 *3*	5/2+		K	Jπ: L(p,t)=0 from 5/2+.
992.203 *10*	(3/2+ to 9/2+)		A	Jπ: γ to 5/2+; weak ε feeding (log *ft*=9.2) from 7/2−.
994.79[#] *6*	(15/2)−		BC G IJ L	Jπ: ΔJ=2, E2 γ 11/2−.
1012.594 *10*	(5/2,7/2,9/2)		A G	Jπ: γs to 5/2+ and 7/2+; log *ft*=8.4 from 7/2−. Negative parity is suggested by (M2) γ to 7/2+, but multipolarity of this γ is considered suspect.
1059.68 *22*	(9/2−,11/2,13/2−)		BC L	Jπ: γ to 9/2−; γ from (13/2−).
1064 *3*	(5/2+)		K	Jπ: L(p,t)=(0) from 5/2+.
1097.590 *10*	(9/2)−		A G I	Jπ: E1 γs to 7/2+ and 9/2+; γ to 11/2+.
1135 *4*			EF	Jπ: L(^{3}He,d)=4,(5) suggest a doublet with Jπ=7/2+,9/2+ and Jπ=9/2−, 11/2−.
1150 *3*	5/2+		K	Jπ: L=(p,t)=0 from 5/2+.
1165.04 *3*	(5/2,7/2,9/2)		A	Jπ: weak ε feeding (log *ft*=8.8, log $f^{1u}t$<8.5) from 7/2−.
1177.32[a] *6*	(13/2−)		B G I L	Jπ: ΔJ=1 γ to 11/2−; γ to 9/2−; dipole γ to (15/2)−.
1184.53[@] *7*	(11/2+)		B G KL	XREF: K(1190). Jπ: γs to 7/2+ and 9/2+; probable band member.

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Adopted Levels, Gammas (continued)

^{149}Eu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
1207.72 *3*	(5/2,7/2,9/2)	A K	XREF: K(1212). J^{π}: γs to 5/2$^+$ and 7/2$^+$; weak ε feeding (log *ft*=8.9, log $f^{1u}t$<8.5) from 7/2$^-$.
1220.56 *10*	5/2$^+$	A EF K	XREF: K(1226). J^{π}: L(p,t)=0 from 5/2$^+$. Also L=2 from (^{3}He,d)/(α,t) ratio.
1231.253 *9*	9/2$^-$	A	J^{π}: M1(+E2) γs to 11/2$^-$ and 7/2$^-$.
1246.41 *5*	(5/2,7/2,9/2)	A	J^{π}: γs to 5/2$^+$ and 7/2$^+$; weak ε feeding (log *ft*=8.4) from 7/2$^-$.
1294 *3*		K	
1312 *4*	5/2$^+$	EF K	J^{π}: L(p,t)=0 from 5/2$^+$.
1333.57[&] *7*	(13/2$^+$)	B G I L	J^{π}: dipole γ to 11/2$^+$.
1356 *3*		K	
1398 *4*	1/2$^+$	EF	J^{π}: L(^{3}He,d)=0.
1440 *4*	1/2$^+$	EF K	J^{π}: L(^{3}He,d)=0.
1471.75[@] *20*	(13/2$^+$)	B G	J^{π}: ΔJ=2, (E2) γ to (9/2$^+$).
1495 *4*	3/2$^+$,5/2$^+$	Ef	J^{π}: L(^{3}He,d)=2.
1503.5 *3*	(11/2$^-$)	fG K	J^{π}: L(α,t)=(5), possibly $h_{11/2}$ orbital.
1529.05[b] *8*	(15/2)$^+$	BC G L	J^{π}: ΔJ=0, E1 γ to (15/2)$^-$; ΔJ=1 γ to (13/2$^-$).
1538 *4*	1/2$^+$	EF	J^{π}: L(^{3}He,d)=0.
1550 *3*		K	
1595 *4*		E	
1610.13[#] *11*	(19/2)$^-$	BC G IJ L	J^{π}: ΔJ=2, E2 γ to (15/2)$^-$.
1625 *4*		E	
1655 *4*		E	
1659.47[&] *8*	(15/2$^+$)	BC G L	J^{π}: ΔJ=2 γ to 11/2$^+$.
1680 *4*		E	
1718? *4*	(7/2$^+$,9/2$^+$)	F	J^{π}: L(α,t)=(4).
1743.8[&] *6*	(15/2$^+$)	B	J^{π}: γ to 11/2$^+$.
1752 *4*		E	
1764.62[a] *13*	(17/2$^-$)	B G L	J^{π}: ΔJ=1, (M1+E2) γ to (15/2)$^-$.
1819 *4*		EF	
1833.9[@] *3*	(15/2$^+$)	B	J^{π}: γs to (11/2$^+$) and (13/2$^+$).
1857 *4*		E	
1890 *4*		EF	
1898.97?[c] *24*	(17/2$^+$)	B	J^{π}: γ to (15/2)$^-$.
1945 *4*		E	
1998.48[&] *21*	(17/2$^+$)	B	J^{π}: ΔJ=(2) γ to (13/2$^+$); γ to (15/2$^+$).
1999.40[b] *16*	(19/2)$^+$	BC G L	J^{π}: ΔJ=2, E2 γ to (15/2)$^+$; E1 γ to (19/2)$^-$.
2029 *4*		E	
2060 *4*		E	
2062.60[&] *24*	(17/2$^+$)	B	J^{π}: γs to (13/2$^+$) and (15/2$^+$).
2092 *4*		E	
2118 *4*		E	
2144 *4*		E	
2168 *4*		E	
2180.84 *20*	(19/2$^-$)	B	J^{π}: ΔJ=(2) γ to (15/2)$^-$; (M1) γ to (19/2)$^-$.
2199 *4*		E	
2247.0[&] *6*	(19/2$^+$)	B	19/2$^+$ band member is 2247 or 2396 level. J^{π}: γs to (15/2$^+$) and (17/2$^+$).
2335.78[#] *18*	(23/2)$^-$	BC G L	J^{π}: ΔJ=2, E2 γ to 1610, (19/2)$^-$.
2342.75[c] *20*	(21/2)$^+$	BC L	J^{π}: ΔJ=1, M1+E2 γ to 1999.3, (19/2)$^+$; dipole γ to 1610, (19/2)$^-$.
2396.27[&] *25*	(19/2$^+$)	B	J^{π}: ΔJ=(2) γ to 1659, (15/2$^+$); γ to 1998.9, (17/2)$^+$.
2453.40[a] *22*	(21/2$^-$)	B	J^{π}: γs to (17/2$^-$) and (19/2)$^+$.
2497.10 *20*	(23/2)$^-$	BC L	J^{π}: ΔJ=2, E2 γ from 2752, (27/2)$^-$; γ to (23/2)$^-$.

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Adopted Levels, Gammas (continued)

^{149}Eu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	XREF	Comments
2562.16[b] *20*	(23/2)$^+$		BC L	J$^{\pi}$: ΔJ=2, E2 γ to (19/2)$^+$; E1 γ to (23/2)$^-$.
2576.84 *19*	(25/2)$^-$		BC G J L	J$^{\pi}$: ΔJ=1, dipole γ to (23/2)$^-$; M1 γ from 2752, (27/2)$^-$.
2609.1[&] *3*	(21/2$^+$)		B	J$^{\pi}$: ΔJ=1, D+Q γ to (19/2$^+$); γ to (17/2$^+$).
2752.10[d] *22*	(27/2)$^-$		BC J L	J$^{\pi}$: ΔJ=2, E2 γ from 3428, (31/2)$^-$; γ to (25/2$^-$).
2828.16[c] *21*	(25/2)$^+$		B	J$^{\pi}$: ΔJ=1, E1 γ to (23/2)$^-$; ΔJ=(2) γ to (21/2)$^+$.
3144.02[#] *24*	(27/2)$^-$		B	J$^{\pi}$: ΔJ=2, E2 γ to (23/2)$^-$; γ to (25/2$^+$).
3218.90[b] *25*	(27/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (23/2)$^+$; γ to (25/2$^+$).
3249.16[c] *24*	(29/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (25/2)$^+$; γ to (27/2$^-$).
3427.8[d] *3*	(31/2)$^-$		B	J$^{\pi}$: ΔJ=1, E1 γ from (33/2)$^+$; ΔJ=2, E2 γ to (27/2)$^-$.
3442.6 *3*	(29/2)$^-$		B	J$^{\pi}$: ΔJ=2, E2 γ to (25/2)$^-$.
3542.6[e] *3*	(31/2)$^+$		B	J$^{\pi}$: ΔJ=(2), (E2) γ to (27/2)$^+$; ΔJ=1, M1 γ to (29/2)$^+$.
3616.3[e] *3*	(33/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (29/2)$^+$; γ to (31/2)$^-$.
3950.6[#] *3*	(31/2$^-$)		B	J$^{\pi}$: ΔJ=(2) γ to (27/2)$^-$.
3991.6[b] *4*	(31/2$^+$)		B	J$^{\pi}$: ΔJ=(2) γ to (27/2)$^+$.
4099.9[c] *4*	(33/2$^+$)		B	J$^{\pi}$: ΔJ=2, (E2) γ to (29/2)$^+$.
4188.5[d] *4*	(35/2)$^-$		B	J$^{\pi}$: ΔJ=2, E2 γ to 3428, (31/2)$^-$.
4222.5[e] *4*	(35/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (31/2)$^+$.
4271.6 *5*	(33/2$^-$)		B	J$^{\pi}$: ΔJ=(2) γ to (29/2)$^-$.
4359.8[e] *4*	(37/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (33/2)$^+$; γ to (35/2)$^-$.
4404.3 *4*	(33/2$^-$)		B	J$^{\pi}$: ΔJ=(2) γ to (29/2)$^-$.
4422.4 *4*	(33/2$^-$)		B	J$^{\pi}$: ΔJ=(2) γ to (29/2)$^-$.
4684.6[#] *3*	(35/2$^-$)		B	E(level): the 35/2 band member is 4685 or 4705 level. J$^{\pi}$: ΔJ=(2) γ to (31/2)$^-$; γ to (35/2$^-$).
4705.3 *4*	(35/2)		B	J$^{\pi}$: γs to (31/2)$^-$ and (31/2$^-$).
4970.0[e] *5*	(39/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (35/2)$^+$.
4995.3[c] *5*	(37/2$^+$)		B	J$^{\pi}$: ΔJ=(2) γ to (33/2$^+$).
5049.8[e] *5*	(41/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (37/2)$^+$.
5070.2 *5*	(35/2,37/2,39/2$^-$)		B	J$^{\pi}$: γ to (35/2$^-$).
5168.0 *5*	(37/2)		B	J$^{\pi}$: ΔJ=1 γ to (35/2)$^-$.
5338.2 *5*	(39/2)		B	J$^{\pi}$: ΔJ=(2) γ to (35/2)$^-$.
5373.9?[#] *5*	(39/2$^-$)		B	J$^{\pi}$: γ to (35/2$^-$); probable band member.
5538.6[e] *6*	(45/2)$^+$		B	J$^{\pi}$: ΔJ=2, E2 γ to (41/2)$^+$.
5607.8 *5*	(39/2)		B	J$^{\pi}$: ΔJ=(2) γ to (35/2)$^-$.
5963.4 *6*	(41/2)		B	J$^{\pi}$: ΔJ=(2) γ to (37/2); γ to (39/2).
6030.2? *11*	(43/2)		B	J$^{\pi}$: γ to (39/2).
6289.1[e] *6*	(47/2)		B	J$^{\pi}$: ΔJ=1 γ to (45/2)$^+$.
6809.4[e] *6*	(49/2)		B	J$^{\pi}$: γ to (45/2)$^+$; possible band member.
6996.8[e] *7*	(51/2)		B	J$^{\pi}$: ΔJ=2, (E2) γ to (47/2).
7027.6 *7*	(45/2,47/2,49/2$^+$)		B	J$^{\pi}$: γ to (45/2)$^+$.
7684.1[e] *7*	(55/2)		B	J$^{\pi}$: ΔJ=(2) γ to (51/2).
14287	(7/2$^-$)	102 keV	D	J$^{\pi}$: analog of 7/2$^-$, g.s. in ^{149}Sm and L=3. Γ from 1967Jo04.
14635	(3/2$^-$)		D	J$^{\pi}$: analog of 3/2$^-$, 350 in ^{149}Sm.
14804	(3/2$^-$)	≈50 keV	D	J$^{\pi}$: analog of 3/2$^-$, 528 in ^{149}Sm and L=1. Γ from 1967Jo04.
15002	(1/2$^-$,3/2$^-$)		D	J$^{\pi}$: analog of (3/2)$^-$, 696 or (3/2$^-$,5/2$^+$), 710 in ^{149}Sm. Also L=(1).
15310	(1/2$^-$,3/2$^-$)		D	J$^{\pi}$: L=(1).
15449	(5/2$^-$)		D	J$^{\pi}$: analog of 5/2$^-$, 1187 in ^{149}Sm and L=(3).
15787			D	

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Adopted Levels, Gammas (continued)

^{149}Eu Levels (continued)

† From a least-squares fit to Eγ data for levels populated in γ-studies, assuming ΔEγ=0.3 keV for Eγ values quoted to tenth of a keV and 1 keV otherwise, where not available. For levels known only from particle transfer reactions, weighted averages have been taken where more than one value is available.

‡ Above 1250, for levels populated in in-beam γ-ray studies (generally J>11/2), together with supporting $\gamma(\theta)$, $\gamma\gamma(\theta)$ (DCO ratios) and γ(lin pol) data, ascending spins are assumed as as the excitation energy increases (which is consistent with the decay pattern of the levels). Also, probable band assignments are used in several cases where angular data do not give unique values.

Band(A): $\pi h_{11/2}\otimes(^{148}$Sm core). Octupole correlations are indicated by E3 transitions to $\pi d_{5/2}$ and $\pi g_{7/2}$ states from the $11/2^-$ bandhead.

@ Band(B): $\pi d_{5/2}\otimes(^{150}$Gd core).

& Seq.(H): Sequence based on 149.7, $7/2^+$ level. The 149.7, $7/2^+$ level is interpreted by 1994Ur01 with configuration of $\pi g_{7/2}\otimes(^{150}$Gd core).

[a] Band(C): Decoupled $\pi h_{11/2}$ band.

[b] Band(D): $\pi h_{11/2}\otimes(3^-)$ octupole band #1.

[c] Band(E): $\pi h_{11/2}\otimes(3^-)$ octupole band #2.

[d] Band(F): $\pi h_{11/2}\otimes\nu(h_{9/2}f_{7/2})_{8+}$. The $35/2^-$ member may be maximum aligned state.

[e] Band(G): Multi-particle band based on $31/2^+$.

$\gamma(^{149}Eu)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
149.732	7/2+	149.730 *10*	100	0.0	5/2+	M1+E2	0.14 *3*	0.587 *8*	B(M1)(W.u.)=0.0127 *8*; B(E2)(W.u.)=6.1 *+29−24* δ: from L-subshell ratios in ^{149}Gd ε.
459.826	(3/2,5/2)+	459.819 *10*	100	0.0	5/2+	M1(+E2)	<0.4	0.0281 *9*	
496.389	11/2−	346.650 *10*	100.0 *6*	149.732	7/2+	M2+E3	−0.075 *25*	0.2326 *33*	B(M2)(W.u.)=0.0686 *14*; B(E3)(W.u.)=2.7 *+21−15* δ: from L-subshell ratios in ^{149}Gd ε.
		496.385 *10*	6.988 *35*	0.0	5/2+	E3		0.0392 *5*	B(E3)(W.u.)=2.71 *6*
534.296	7/2+	384.539 *10*	2.44 *6*	149.732	7/2+	D			I_γ: others: 27 *7* in (^{13}C,3nγ) and 9 *1* (p,2nγ) seems discrepant.
		534.294 *10*	100.0 *8*	0.0	5/2+	M1(+E2)	<0.4	0.0192 *6*	
666.291	9/2+	132.004 *10*	3.35 *18*	534.296	7/2+	M1		0.837 *12*	I_γ: others: 25 *12* in (^{13}C,3nγ) and 6.3 *16* in (d,2nγ).
		516.550 *10*	100.0 *14*	149.732	7/2+	M1+E2	0.75 *+27−24*	0.0182 *14*	
		666.289 *10*	32.46 *23*	0.0	5/2+	E2		0.00649 *9*	Mult.,δ: from ce data in ^{149}Gd ε, δ(E2/M1)>1.3. From $\gamma(\theta)$ in (p,4nγ) mult=Q. I_γ: others: 45 *1* in (d,2nγ), 87 *25* in (^{13}C,3nγ).
691.8?	(3/2,5/2,7/2)	232.0	100	459.826	(3/2,5/2)+	D			
748.602	7/2−	82.33 *8*	0.064 *12*	666.291	9/2+	[E1]		0.479 *7*	
		214.275 *13*	2.36 *5*	534.296	7/2+	(E1)		0.0365 *5*	
		252.210 *10*	3.28 *7*	496.389	11/2−	E2		0.1006 *14*	δ(E2/M1)>1.7.
		598.89 *5*	0.243 *17*	149.732	7/2+				
		748.604 *10*	100.0 *12*	0.0	5/2+	E1+M2	+0.041 *13*	0.00194 *4*	δ: from $\gamma(\theta$,T) in ^{149}Gd ε.
776.69	(3/2 to 9/2)	776.69 *10*	100	0.0	5/2+				
795.030	9/2−	128.74 *2*	0.133 *9*	666.291	9/2+	E1+M2	0.18 *6*	0.36 *16*	
		260.736 *10*	4.66 *5*	534.296	7/2+	E1		0.02189 *31*	
		298.633 *10*	100.0 *5*	496.389	11/2−	M1+E2	+0.15 *2*	0.0884 *13*	δ: from $\gamma(\theta$,T) in ^{149}Gd ε.
		645.315 *10*	5.27 *3*	149.732	7/2+	E1		0.00259 *4*	
		794.7[@]	<0.0035	0.0	5/2+				
798.934	(9/2+)	264.66 *4*	77 *9*	534.296	7/2+	(M1)		0.1229 *17*	
		302.58[@] *3*	25 *4*	496.389	11/2−				
		649.11 *7*	27 *5*	149.732	7/2+				
		798.91 *2*	100 *4*	0.0	5/2+				Mult.: (M2) proposed by 1996Vy02 in ^{149}Gd ε decay.
812.631	5/2+	278.31 *3*	28 *4*	534.296	7/2+	[M1,E2]		0.090 *17*	
		352.80 *2*	14.5 *10*	459.826	(3/2,5/2)+	[M1,E2]		0.046 *11*	
		662.902 *10*	100.0 *17*	149.732	7/2+	M1(+E2)	<0.85	0.0105 *10*	
		812.630 *10*	52.5 *9*	0.0	5/2+	M1,E2		0.0055 *14*	I_γ: from ^{149}Gd ε. Value of 16 *4* in (d,2nγ) is too low.
875.939	5/2+	127.1[@]	<0.95	748.602	7/2−	[E1]		0.1483 *21*	

$^{149}_{63}Eu_{86}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{149}Eu)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[#]	Comments
875.939	$5/2^+$	341.65 *5*	50.2 *35*	534.296	$7/2^+$	[M1,E2]		0.051 *12*	
		416.08 *3*	15.4 *5*	459.826	$(3/2,5/2)^+$	[M1,E2]		0.030 *8*	
		726.21 *1*	52.4 *16*	149.732	$7/2^+$	M1(+E2)	<0.65	0.0086 *6*	
		875.91 *4*	100.0 *16*	0.0	$5/2^+$	M1(+E2)	<0.3	0.00573 *13*	
910.88	$11/2^+$	244.55 *6*	20.5 *8*	666.291	$9/2^+$	D			I_γ: from (d,2nγ) and (d,3nγ). Iγ=77 *18* in (^{13}C,3nγ); 59 *5* (p,2nγ) seem too high. This γ is not reported in ε decay, probably because it is too weak to be detected.
		761.12 *5*	100 *3*	149.732	$7/2^+$	E2		0.00476 *7*	I_γ: from (d,2nγ).
933.120	$(9/2)^+$	138.10 *1*	12.7 *9*	795.030	$9/2^-$	(E1+M2)	0.18 *4*	0.29 *8*	
		184.51 *1*	7.8 *3*	748.602	$7/2^-$	(E1+M2)	0.25 *5*	0.17 *4*	
		266.91 *7*	3.9 *11*	666.291	$9/2^+$	(M1,E2)		0.102 *18*	
		398.82 *1*	7.18 *18*	534.296	$7/2^+$	[M1,E2]		0.033 *8*	
		436.62 *17*	3.3 *5*	496.389	$11/2^-$				
		783.45[@] *10*	1.24 *16*	149.732	$7/2^+$				
		933.06 *7*	100.0 *8*	0.0	$5/2^+$	E2		0.00303 *4*	δ(E2/M1)>1.4.
938.609	$7/2^+$	125.98 *1*	2.00 *4*	812.631	$5/2^+$	M1,E2		1.01 *5*	
		139.74 *8*	0.19 *2*	798.934	$(9/2^+)$				
		189.7[@]	<0.03	748.602	$7/2^-$	[E1]		0.0504 *7*	
		272.320 *10*	44.0 *7*	666.291	$9/2^+$	M1+E2	0.33 *+12−8*	0.1104 *29*	
		404.299 *10*	2.69 *3*	534.296	$7/2^+$	M1,E2		0.032 *8*	
		478.78 *2*	2.80 *4*	459.826	$(3/2,5/2)^+$	E2(+M1)	>4	0.0153 *4*	
		788.875 *10*	100.0 *10*	149.732	$7/2^+$	M1+E2	−5 *2*	0.00451 *20*	δ: from $\gamma(\theta$,T) in ^{149}Gd ε.
		938.616 *10*	33.1 *3*	0.0	$5/2^+$	M1+E2	1.0 *+10−5*	0.0040 *6*	
952.667	($3/2^+$ to $9/2^+$)	418.56 *21*	11.5 *14*	534.296	$7/2^+$				
		492.88 *6*	39.7 *27*	459.826	$(3/2,5/2)^+$				
		802.93 *2*	100 *4*	149.732	$7/2^+$				
		952.65 *4*	26.3 *25*	0.0	$5/2^+$				
992.203	($3/2^+$ to $9/2^+$)	842.29[@] *10*	16.5 *15*	149.732	$7/2^+$				
		992.201 *10*	100.0 *27*	0.0	$5/2^+$				
994.79	$(15/2)^-$	498.45 *6*	100	496.389	$11/2^-$	E2		0.01349 *19*	
1012.594	(5/2,7/2,9/2)	213.39[@] *8*	5.1 *11*	798.934	$(9/2^+)$				E_γ: poor fit.
		478.27 *10*	27 *5*	534.296	$7/2^+$				
		552.761 *16*	100.0 *28*	459.826	$(3/2,5/2)^+$	(E2(+M1))	>0.4	0.0137 *34*	
		862.862 *12*	76.8 *11*	149.732	$7/2^+$				Mult.: (M2) assignment is suspect since it is inconsistent with ΔJ=0,1 which would favor E1 over M2.
		1012.61 *2*	26.0 *8*	0.0	$5/2^+$				
1059.68	($9/2^-$,11/2,$13/2^-$)	264.6 *3*	100	795.030	$9/2^-$				E_γ: from (p,4nγ).
1097.590	$(9/2)^-$	186.67 *4*	1.02 *8*	910.88	$11/2^+$	[E1]		0.0526 *7*	
		349.04 *10*	6.9 *7*	748.602	$7/2^-$	[M1,E2]		0.048 *12*	

$^{149}_{63}Eu_{86}$-7

γ(^{149}Eu) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α#	Comments
1097.590	(9/2)$^-$	431.297 *12*	7.37 *15*	666.291	9/2$^+$	E1		0.00633 *9*	
		563.49 *10*	1.11 *11*	534.296	7/2$^+$				
		601.201 *15*	6.17 *13*	496.389	11/2$^-$	(M1)		0.01468 *21*	
		947.858 *19*	100.0 *15*	149.732	7/2$^+$	E1		1.20×10^{-3} *2*	
		1097.54@	<0.2	0.0	5/2$^+$				
1165.04	(5/2,7/2,9/2)	1015.30 *3*	100	149.732	7/2$^+$				
1177.32	(13/2$^-$)	117.6	9 *3*	1059.68	(9/2$^-$,11/2,13/2$^-$)				
		182.7 *1*	28 *3*	994.79	(15/2)$^-$	D			E_γ: from (d,2nγ). I_γ: weighted average of 25.0 *94* from (^{13}C,3nγ), 28.9 *11* from (d,2nγ), 17.6 *44* from (p,2nγ), and 22.4 *78* from (p,4nγ).
		382.5 *3*	22 *6*	795.030	9/2$^-$				
		680.88 *6*	100 *4*	496.389	11/2$^-$	D+Q			E_γ,I_γ: from (d,2nγ). Others: Iγ=100 *13* in (^{13}C,3nγ), 100 *7* in (p,2nγ), 100 *10* in (p,4nγ).
1184.53	(11/2$^+$)	385.7 *1*	76 *4*	798.934	(9/2$^+$)	D			E_γ,I_γ: from (d,2nγ). Other: Iγ=58 *25* in (^{13}C,3nγ).
		518.5	50 *17*	666.291	9/2$^+$				
		650.1 *1*	100 *4*	534.296	7/2$^+$				E_γ,I_γ: from (d,2nγ).
1207.72	(5/2,7/2,9/2)	673.43 *3*	100 *13*	534.296	7/2$^+$				
		1207.70 *7*	34 *3*	0.0	5/2$^+$				
1220.56	5/2$^+$	421.59 *18*	100 *15*	798.934	(9/2$^+$)				
		1220.57 *12*	22.2 *14*	0.0	5/2$^+$				
1231.253	9/2$^-$	436.24 *3*	34.5 *15*	795.030	9/2$^-$	(M1)		0.0331 *5*	
		482.640 *12*	58.7 *11*	748.602	7/2$^-$	M1(+E2)	<2	0.021 *4*	
		734.86 *1*	100.0 *23*	496.389	11/2$^-$	M1(+E2)	<2	0.0074 *15*	
		1081.58 *3*	14.1 *5*	149.732	7/2$^+$				
		1231.2 *2*	0.27 *8*	0.0	5/2$^+$	[M2]		0.00617 *9*	
1246.41	(5/2,7/2,9/2)	1096.68 *5*	79 *7*	149.732	7/2$^+$				
		1246.38 *8*	100 *5*	0.0	5/2$^+$				
1333.57	(13/2$^+$)	149.2	33 *8*	1184.53	(11/2$^+$)				
		422.67 *7*	75 *25*	910.88	11/2$^+$	D			E_γ: from (d,2nγ).
		667.1 *5*	100 *25*	666.291	9/2$^+$				E_γ: from (p,4nγ).
1471.75	(13/2$^+$)	287.2	57 *29*	1184.53	(11/2$^+$)				
		672.9	100 *29*	798.934	(9/2$^+$)	Q			
1503.5	(11/2$^-$)	708.5 *3*	100	795.030	9/2$^-$				E_γ: from (d,2nγ).
1529.05	(15/2)$^+$	351.7 *2*	48 *6*	1177.32	(13/2$^-$)	D			E_γ: from (d,2nγ).
		534.27 *6*	100 *7*	994.79	(15/2)$^-$	E1		0.00389 *5*	E_γ: from (d,2nγ).
1610.13	(19/2)$^-$	615.15 *12*	100	994.79	(15/2)$^-$	E2		0.00788 *11*	E_γ: weighted average of 614.9 *2* from (^{6}Li,3nγ), 615.05 *8* from (d,2nγ), 615.50 *15* from (d,3nγ), and 615.4 *2* from (p,4nγ).

$^{149}_{63}$Eu$_{86}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{149}Eu)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α#	Comments
1659.47	(15/2+)	325.6 *5*	27 *13*	1333.57	(13/2+)			E_γ: from (d,2nγ).
		748.60 *7*	100 *27*	910.88	11/2+	Q		E_γ: from (d,2nγ).
1743.8	(15/2+)	410	100 *25*	1333.57	(13/2+)			
		833	50 *13*	910.88	11/2+			
1764.62	(17/2−)	154.2 *2*	45 *17*	1610.13	(19/2)−			E_γ: from (d,2nγ). I_γ: weighted average of 33 *17* from (^{13}C,3nγ) and 59 *19* from (p,4nγ).
		235.8	25 *8*	1529.05	(15/2)+			
		587.7	50 *17*	1177.32	(13/2−)			
		769.9 *2*	100 *25*	994.79	(15/2)−	(M1+E2)	0.0063 *17*	E_γ: from (d,2nγ).
1833.9	(15/2+)	362.2	80 *40*	1471.75	(13/2+)			
		500	60 *20*	1333.57	(13/2+)			
		649	100 *40*	1184.53	(11/2+)			
1898.97?	(17/2+)	371@	60 *20*	1529.05	(15/2)+			
		904.3	100 *20*	994.79	(15/2)−			
1998.48	(17/2+)	339.2	40 *20*	1659.47	(15/2+)			
		664.8	100 *40*	1333.57	(13/2+)	(Q)		
1999.40	(19/2)+	234.7	20 *2*	1764.62	(17/2−)	D		
		389.3 *2*	55 *4*	1610.13	(19/2)−	E1	0.00807 *11*	E_γ: from (d,2nγ).
		470.4 *5*	100 *7*	1529.05	(15/2)+	E2	0.01576 *23*	E_γ: from (p,4nγ).
2062.60	(17/2+)	228.7	100 *40*	1833.9	(15/2+)			
		319	100 *40*	1743.8	(15/2+)			
		729.0	100 *40*	1333.57	(13/2+)			
2180.84	(19/2−)	570.8	78 *33*	1610.13	(19/2)−	(M1)	0.01672 *23*	
		1186.2	100 *22*	994.79	(15/2)−	(Q)		
2247.0	(19/2+)	184	100 *40*	2062.60	(17/2+)			
		503	80 *40*	1743.8	(15/2+)			
		588	80 *40*	1659.47	(15/2+)			
2335.78	(23/2)−	725.6 *2*	100	1610.13	(19/2)−	E2	0.00531 *7*	E_γ: weighted average of 725.1 *3* from (^{6}Li,3nγ), 725.9 *2* from (d,2nγ), and 725.6 *3* from (p,4nγ).
2342.75	(21/2)+	343.5	21 *5*	1999.40	(19/2)+	M1+E2	0.050 *11*	
		444.0	8 *3*	1898.97?	(17/2+)			
		732.2 *3*	100 *11*	1610.13	(19/2)−	D		E_γ: from (^{6}Li,3nγ).
2396.27	(19/2+)	334	43 *14*	2062.60	(17/2+)			
		398	57 *14*	1998.48	(17/2+)			
		736.7	100 *29*	1659.47	(15/2+)	(Q)		
2453.40	(21/2−)	454.0	80 *40*	1999.40	(19/2)+			
		689.0	100 *40*	1764.62	(17/2−)			
2497.10	(23/2)−	161.5	4.4 *9*	2335.78	(23/2)−	D+Q		
		316.5	3.5 *9*	2180.84	(19/2−)			
		886.8 *3*	100 *4*	1610.13	(19/2)−	(E2)	0.00338 *5*	E_γ: from (^{6}Li,3nγ).
2562.16	(23/2)+	109.0	3.1 *15*	2453.40	(21/2−)			
		219	2.3 *8*	2342.75	(21/2)+			
		226.3	4.6 *15*	2335.78	(23/2)−	E1	0.0316 *4*	

$^{149}_{63}Eu_{86}$-9

γ(^{149}Eu) (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	α #	Comments
2562.16	(23/2)$^+$	562.6 *3*	100 *6*	1999.40	(19/2)$^+$	E2	0.00985 *14*	E_γ: from (^{6}Li,3nγ).
2576.84	(25/2)$^-$	79.9	0.74 *25*	2497.10	(23/2)$^-$			
		241.0 *1*	100 *3*	2335.78	(23/2)$^-$	D		E_γ: from (d,2nγ).
2609.1	(21/2$^+$)	212.8	100 *33*	2396.27	(19/2$^+$)	D+Q		
		362	50 *17*	2247.0	(19/2$^+$)			
		610.7	83 *50*	1998.48	(17/2$^+$)			
2752.10	(27/2)$^-$	174.9 *3*	100 *3*	2576.84	(25/2)$^-$	M1(+E2)	0.360 *22*	E_γ: from (^{6}Li,3nγ).
		255.1	9.2 *14*	2497.10	(23/2)$^-$	E2	0.0970 *14*	
		416.5	0.8 *3*	2335.78	(23/2)$^-$			
2828.16	(25/2)$^+$	266.0	39 *7*	2562.16	(23/2)$^+$	M1+E2	0.103 *18*	
		485.4	23 *4*	2342.75	(21/2)$^+$	(Q)		
		492.4	100 *3*	2335.78	(23/2)$^-$	E1	0.00467 *7*	
3144.02	(27/2)$^-$	316.0	8.1 *16*	2828.16	(25/2)$^+$			
		808.3	100 *10*	2335.78	(23/2)$^-$	E2	0.00415 *6*	
3218.90	(27/2)$^+$	390.6	4.8 *16*	2828.16	(25/2)$^+$			
		656.7	100 *10*	2562.16	(23/2)$^+$	E2	0.00672 *9*	
3249.16	(29/2)$^+$	30.3		3218.90	(27/2)$^+$			
		105.1	3.2 *8*	3144.02	(27/2)$^-$	D		
		421.0	65 *3*	2828.16	(25/2)$^+$	E2	0.02139 *30*	
		497.0	100 *9*	2752.10	(27/2)$^-$	(E1)	0.00457 *6*	
3427.8	(31/2)$^-$	675.7	100	2752.10	(27/2)$^-$	E2	0.00628 *9*	
3442.6	(29/2)$^-$	865.8	100	2576.84	(25/2)$^-$	E2	0.00357 *5*	
3542.6	(31/2)$^+$	293.3	100 *4*	3249.16	(29/2)$^+$	M1	0.0934 *13*	
		323.5	4.7 *14*	3218.90	(27/2)$^+$	(Q)		
3616.3	(33/2)$^+$	73.2		3542.6	(31/2)$^+$			
		188.7	100 *8*	3427.8	(31/2)$^-$	E1	0.0511 *7*	
		367.3	55 *6*	3249.16	(29/2)$^+$	E2	0.0316 *4*	
3950.6	(31/2$^-$)	806.8	100	3144.02	(27/2)$^-$	(Q)		
3991.6	(31/2$^+$)	772.7	100	3218.90	(27/2)$^+$	(Q)		
4099.9	(33/2$^+$)	850.7	100	3249.16	(29/2)$^+$	(E2)	0.00371 *5*	
4188.5	(35/2)$^-$	760.7	100	3427.8	(31/2)$^-$	E2	0.00476 *7*	
4222.5	(35/2)$^+$	680.0	100	3542.6	(31/2)$^+$	E2	0.00619 *9*	
4271.6	(33/2$^-$)	829.0	100	3442.6	(29/2)$^-$	(Q)		
4359.8	(37/2)$^+$	137.4	3.0 *12*	4222.5	(35/2)$^+$			
		171.4	3.5 *12*	4188.5	(35/2)$^-$			
		743.3	100 *6*	3616.3	(33/2)$^+$	E2	0.00502 *7*	
4404.3	(33/2$^-$)	961.8	100	3442.6	(29/2)$^-$	(Q)		
4422.4	(33/2$^-$)	979.8	100	3442.6	(29/2)$^-$	(Q)		
4684.6	(35/2$^-$)	262.2	50 *17*	4422.4	(33/2$^-$)			
		280.3	33 *8*	4404.3	(33/2$^-$)			
		496	42 *17*	4188.5	(35/2)$^-$			
		733.8	100 *25*	3950.6	(31/2$^-$)			
		1256.9	58 *25*	3427.8	(31/2)$^-$	(Q)		

$^{149}_{63}$Eu$_{86}$-10

γ(^{149}Eu) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α#
4705.3	(35/2)	755.1	100 *40*	3950.6	(31/2$^-$)		
		1277.0	100 *40*	3427.8	(31/2)$^-$		
4970.0	(39/2)$^+$	747.5	100	4222.5	(35/2)$^+$	E2	0.00496 *7*
4995.3	(37/2$^+$)	895.4	100	4099.9	(33/2$^+$)	(Q)	
5049.8	(41/2)$^+$	690.0	100	4359.8	(37/2)$^+$	E2	0.00598 *8*
5070.2	(35/2,37/2,39/2$^-$)	385.6	100	4684.6	(35/2$^-$)		
5168.0	(37/2)	979.5	100	4188.5	(35/2)$^-$	D+Q	
5338.2	(39/2)	1149.7	100	4188.5	(35/2)$^-$	(Q)	
5373.9?	(39/2$^-$)	689.3	100	4684.6	(35/2$^-$)		
5538.6	(45/2)$^+$	488.8	100	5049.8	(41/2)$^+$	E2	0.01421 *20*
5607.8	(39/2)	1419.3	100	4188.5	(35/2)$^-$	(Q)	
5963.4	(41/2)	356	9 *3*	5607.8	(39/2)		
		795.4	100 *13*	5168.0	(37/2)	(Q)	
6030.2?	(43/2)	692	100	5338.2	(39/2)		
6289.1	(47/2)	750.4	100	5538.6	(45/2)$^+$	D+Q	
6809.4	(49/2)	1270.8	100	5538.6	(45/2)$^+$		
6996.8	(51/2)	187.5	24 *8*	6809.4	(49/2)		
		707.7	100 *24*	6289.1	(47/2)	(E2)	0.00563 *8*
7027.6	(45/2,47/2,49/2$^+$)	1489.0	100	5538.6	(45/2)$^+$		
7684.1	(55/2)	687.3	100	6996.8	(51/2)	(Q)	

† From ^{149}Gd ε decay, where available, since the Eγ values in this study are known more precisely than in any other γ-ray dataset. For levels populated in in-beam γ-ray studies, values are generally from ^{139}La(^{13}C,3nγ) (1994Ur01), since this dataset provides most detailed measurements.

‡ From ce data in ^{149}Gd ε decay, γ(θ) in (p,2nγ) and (p,4nγ), γ(lin pol) and γγ(θ)(DCO) in (^{13}C,3nγ). For γ(θ) in datasets of high-spin levels, ΔJ=2 transitions are given as Q, but from systematics and absence of isomers, mult=E2 is more likely than M2 for all such transitions.

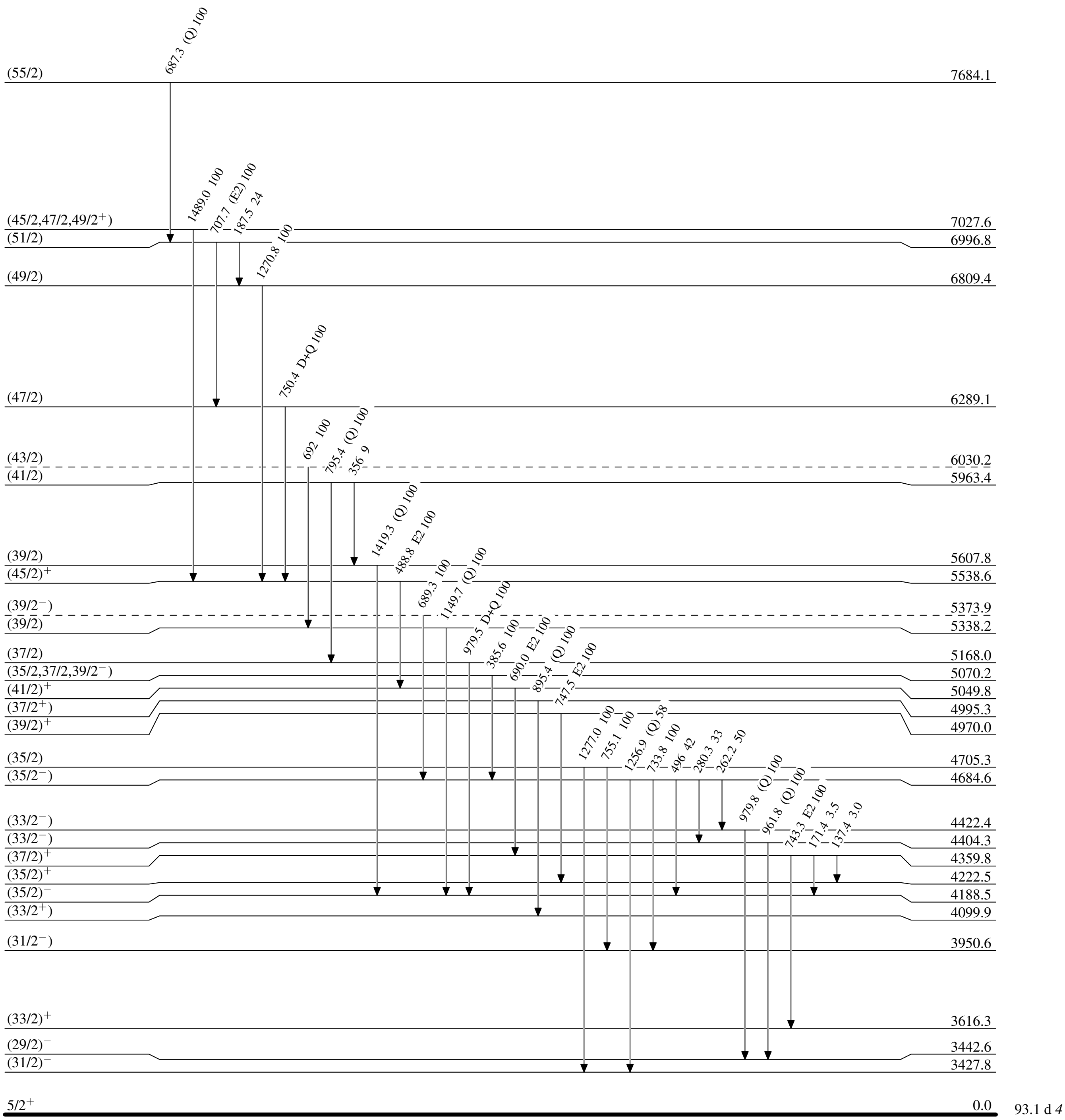
Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

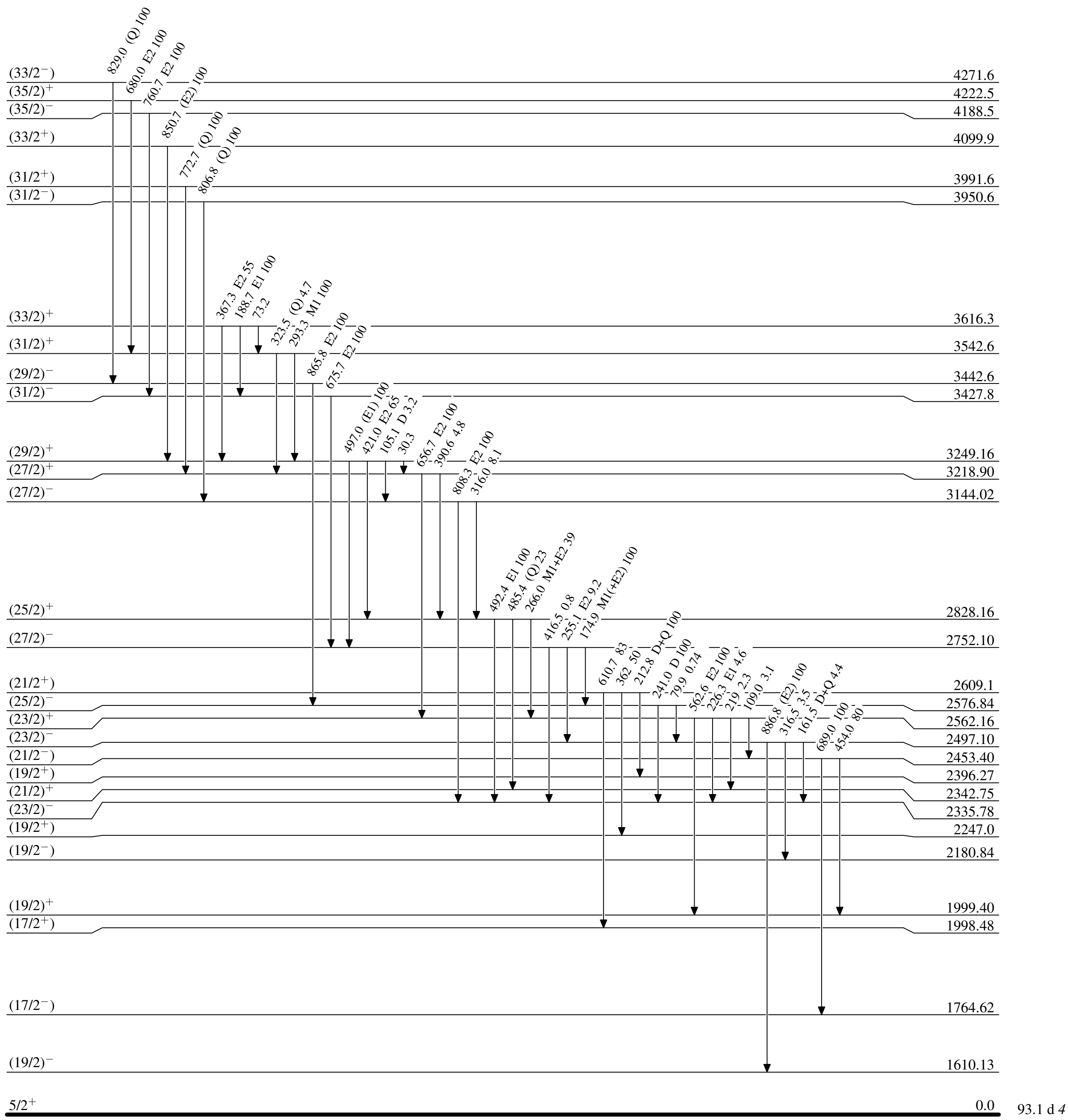


$^{149}_{63}Eu_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



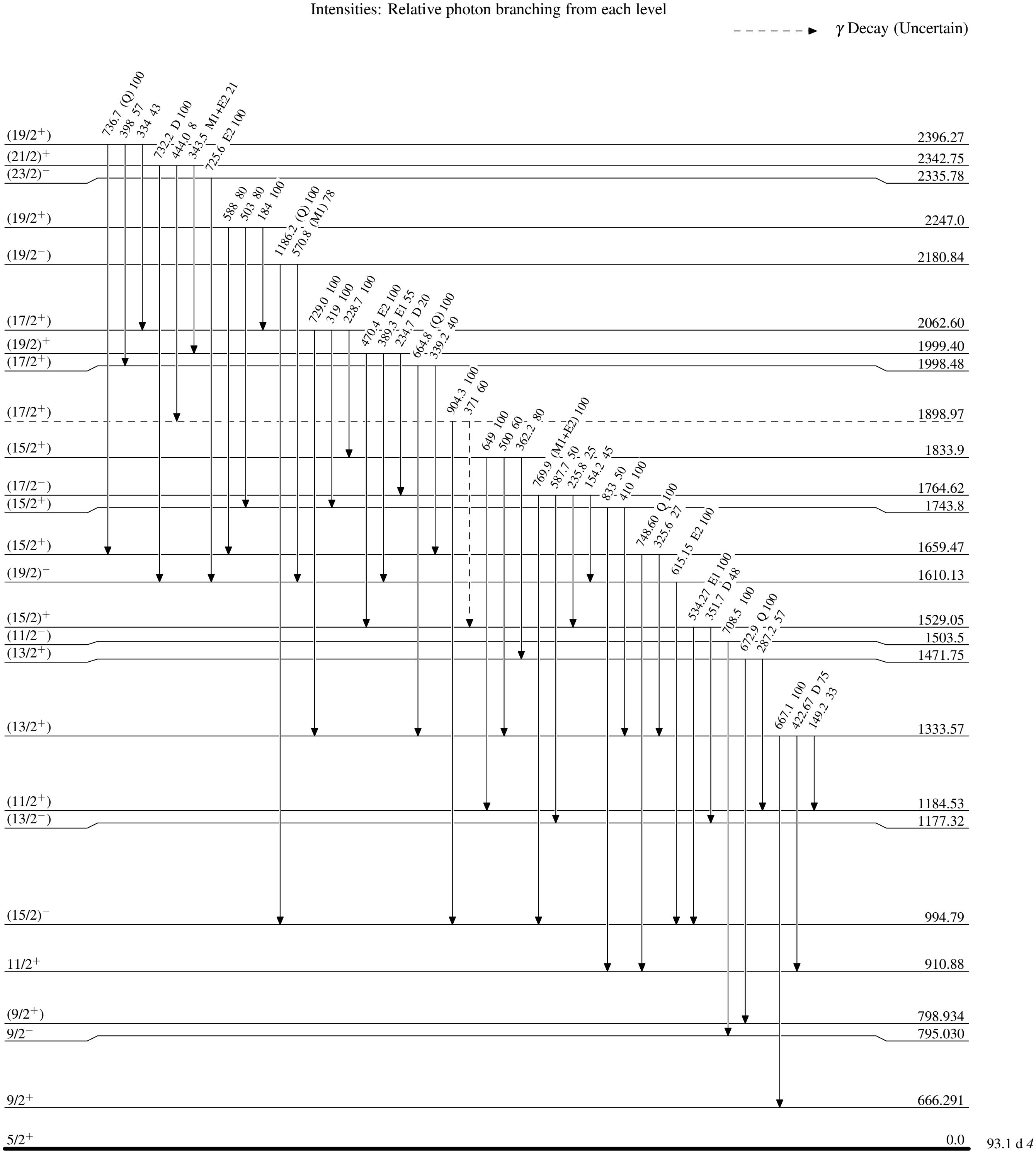
$^{149}_{63}Eu_{86}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

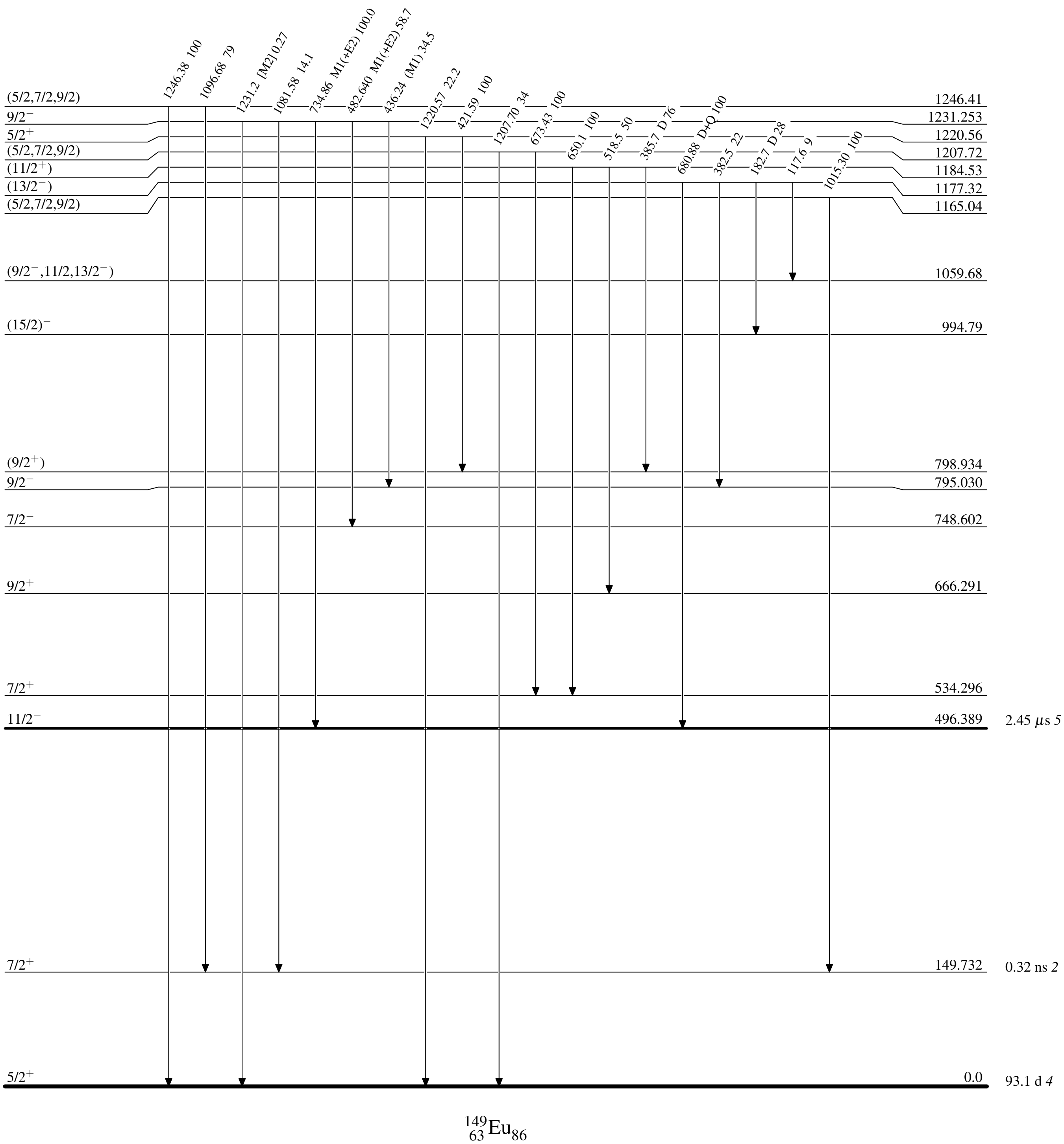


$^{149}_{63}Eu_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



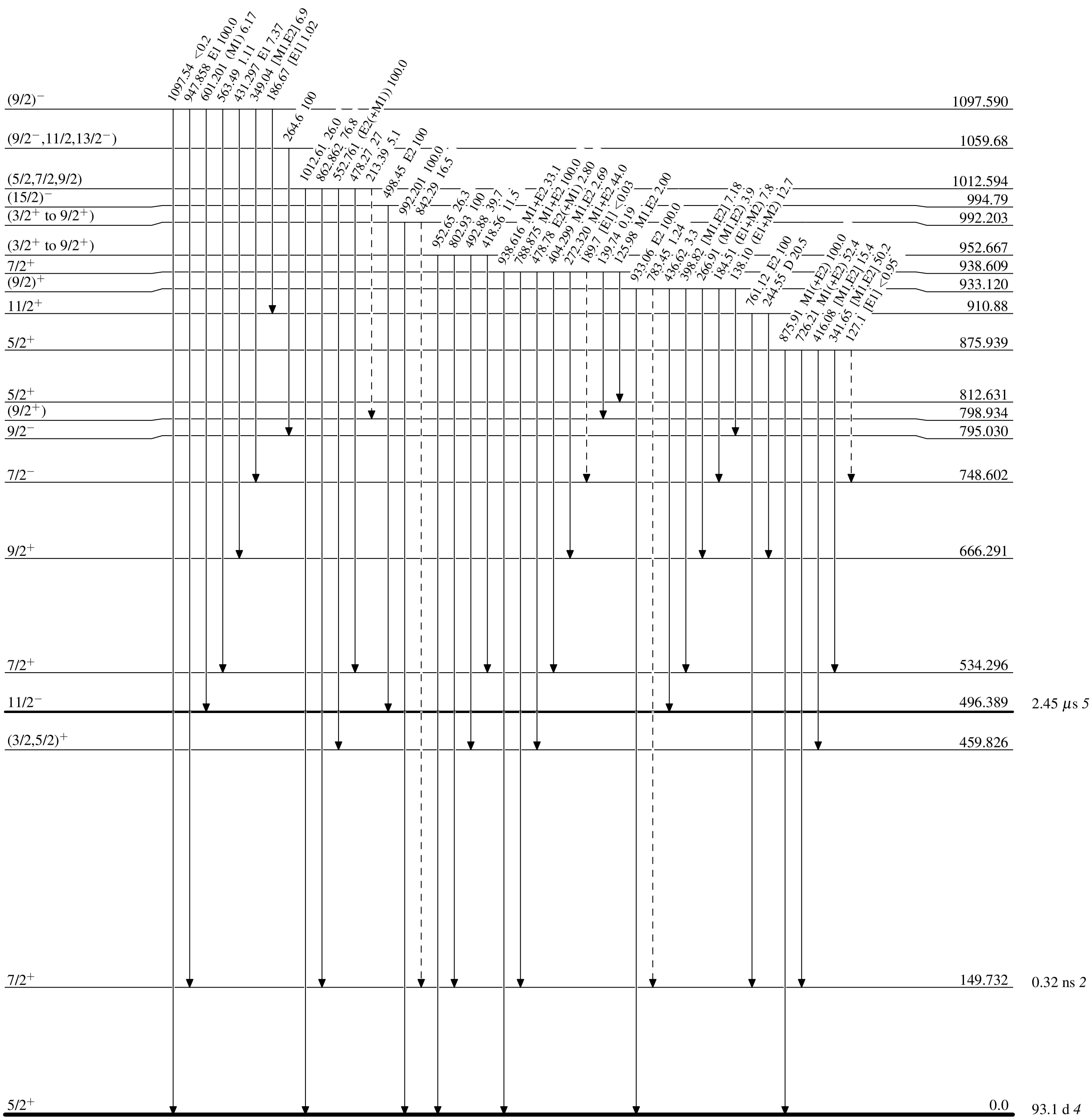
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - ▶ γ Decay (Uncertain)



$^{149}_{63}Eu_{86}$

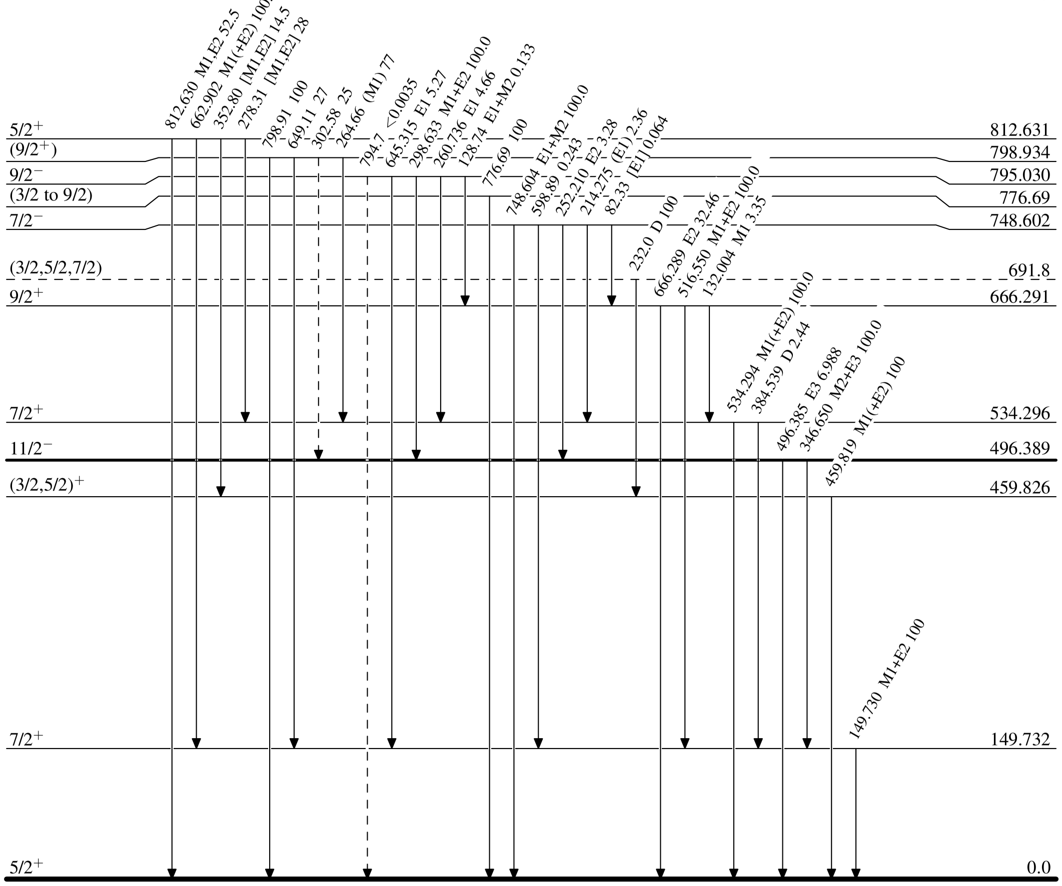
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

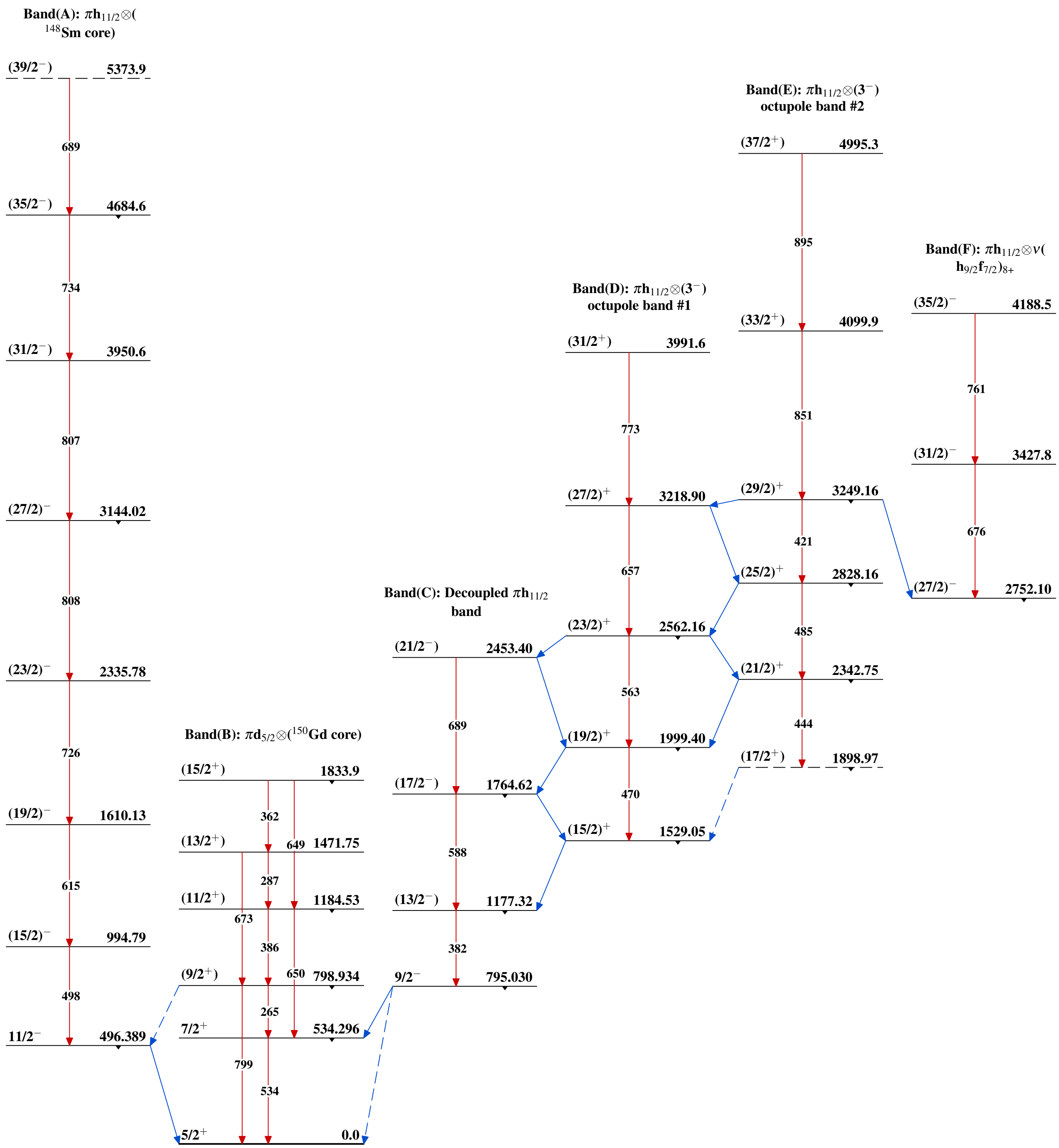
Legend

γ Decay (Uncertain)



$^{149}_{63}Eu_{86}$

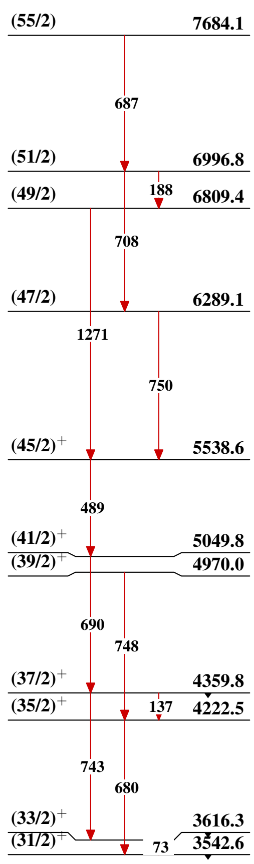
Adopted Levels, Gammas



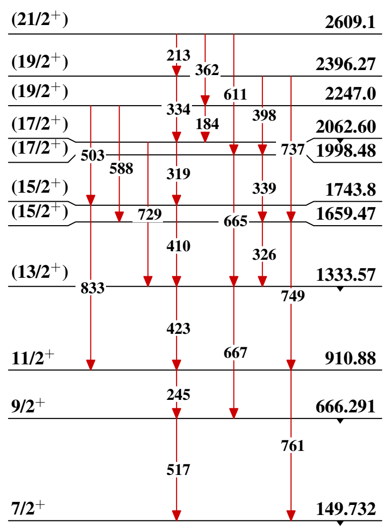
$^{149}_{63}Eu_{86}$

Adopted Levels, Gammas (continued)

Band(G): Multi-particle band based on 31/2$^+$



Seq.(H): Sequence based on 149.7, 7/2$^+$ level



$^{149}_{63}Eu_{86}$