^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15

History

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

Parent: ^{149}Gd: E=0; $J^\pi=7/2^-$; $T_{1/2}$=9.28 d *10*; Q(ε)=1314 *4*; %ε+%$β^+$ decay=99.9995 *1*

^{149}Gd-J^π,$T_{1/2}$: From ^{149}Gd Adopted Levels.

^{149}Gd-Q(ε): From 2021Wa16.

^{149}Gd-%ε+%$β^+$ decay: %α=0.00050 *12* from weighted average of %α=0.00063 *12* (1996Vy02) (from Iα(3019α in ^{149}Gd α decay)/Iγ(149.8)=0.0000118 *23*), 0.00046 *15* (1965Si06) (from Iα/I(εK)=4.61×10^{-6}), and 0.00040 *12* (1966Wi12) (from Iα/I(εK)=4.01×10^{-6}). Others: Iα/I(εK)=3×10^{-6} (1967Go32), 0.0007% (1953Ra02).

2006Ri11: ^{149}Gd obtained from neutron irradiation of ^{148}Gd using Triga reactor. Measured Eγ, Iγ, neutron capture σ using a high-efficiency Ge detector.

1987Ad02: measured Eγ, Iγ, integral γγ.

1990Me15: measured Eγ, Iγ, K x ray.

1992Ca11: measured Eγ, Iγ, ce. Eγ values are given without uncertainties.

Other main references for Eγ, Iγ, ce, γγ-coin, (ce)γ-coin and ce data:

1996Vy02: Measured Eγ, Iγ, γγ, ce. (ce)γ coin, I(x rays), α decay. Analysis of data reported earlier (1978-1980) in secondary references. Several new γ rays are listed in this paper; energies and ε feedings for 16 excited states are also listed. Full details of this work are not available.

1975Al14: measured Eγ, Iγ, γγ, ce, (ce)γ coin, I(x rays).

1975Se18: measured Eγ, Iγ, γγ, γγ(θ).

1974Ga13: measured ce and Eγ.

1970Ep01 (also 1970EpZZ): measured Eγ, Iγ, γγ, I(x rays), γγ(t).

1966Ha23: measured ce data.

1966Av05: measured ce data.

Other measurements:

No $β^+$ radiation reported by 1953Ra02, and I($β^+$)/$ε_K$<0.001 (1970Ep01).

Eγ, Iγ data using Ge(Li) detectors: 1973Ag08, 1969Gr32, 1968Wi21, 1968Ad01, 1967Cl05, 1966Wi12, 1966Ja11. Others using NaI(Tl) detectors: 1962Pr06, 1961So04, 1957Sh46.

ce: 1974Ga13, 1968Wi21, 1958An35, 1958Ad38.

γγ-, γ(ce)-, (ce)(ce)-coin: 1968Wi21, 1966Ja11, 1962Pr06, 1961So04, 1961Be36, 1961Be33, 1959Dz05, 1956St23.

K x-ray intensity: 1975Al14, 1970Ep01, 1968Ad01, 1962Pr06.

γγ(t): 1970Kl07, 1969Iv02, 1962Pr06, 1962Be25, 1962Be20, 1961Be08, 1961So04, 1956St23.

γγ(θ): 1985Be64, 1962Pr06.

γγ(θ,H,t): 1970Kl07 (also 1969Kl12).

γ(θ,T): 1987Kr11 (also 1985Fi06), 1987Be33, 1986Va16 (also 1985Va08). μ(^{149}Gd g.s.) determined from these data together with δ for some of the transitions in ^{149}Eu.

$T_{1/2}$(^{149}Gd g.s.): 1970Ep01, 1962Pr06, 1958Pa16, 1958An35, 1957Sh46, 1951Ho30.

Assignment for ^{149}Gd isotope: 1966Mc11, 1958Ad38, 1958Go72, 1957Sh46, 1957Go40, 1958Go72, 1953Ra02, 1951Ho30.

^{149}Gd α decay: 1967Go32, 1966Wi12, 1965Si06, 1965Ma48, 1953Ra02, 1951Ho30.

Total decay energy deposit of 1294 keV *71* calculated by RADLIST code is in agreement with expected value of 1314 keV *4*, indicating the completeness of the decay scheme.

^{149}Eu Levels

A tentative 956-keV level proposed by 1975Se18; and 869- and 1051-keV levels proposed by 1996Vy02 are not confirmed by 2006Ri11.

E(level)‡	J^π†	$T_{1/2}$†	Comments
0.0	$5/2^+$	93.1 d *4*	
149.732 *5*	$7/2^+$	0.32 ns *2*	Additional information 1.

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^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

^{149}Eu Levels (continued)

E(level)‡	Jπ†	T1/2†	Comments
			T1/2: γγ(t) (1962Be25). Others: 1962Pr06, 1956St23.
459.826 *8*	(3/2,5/2)+		E(level): 459.853 *23* (Jπ=5/2+,7/2+) (1996Vy02).
496.389 *6*	11/2−	2.45 μs *5*	g=+1.103 (1970Kl07) E(level): 496.398 *12* (1996Vy02). T1/2: γγ(t). Weighted average of 2.48 μs *5* (1961Be08), 2.43 μs *3* (1970Kl07), 2.42 μs *21* (1962Pr06). Others: 2.6 μs (1969Iv02), 3.3 μs *4* (1961So04). g factor from (299γ)(347γ)(θ,H,t) (1970Kl07).
534.295 *5*	7/2+		E(level): 534.296 *22* (1996Vy02).
666.291 *6*	9/2+		E(level): 666.290 *24* (Jπ=7/2+,9/2+) (1996Vy02).
748.601 *6*	7/2−		E(level): 748.610 *25* (1996Vy02).
776.69 *10*	(3/2 to 9/2)		
795.030 *7*	9/2−		E(level): 794.98 *6* (1996Vy02).
798.937 *15*	(9/2+)		
812.631 *7*	5/2+		E(level): 812.63 *5* (Jπ=5/2+,7/2+) (1996Vy02).
875.939 *10*	5/2+		E(level): 875.01 *5* (Jπ=5/2+,7/2+) (1996Vy02).
910.89 *4*	11/2+		
933.119 *8*	(9/2)+		E(level): 933.13 *3* (Jπ=7/2+) (1996Vy02).
938.609 *6*	7/2+		E(level): 938.61 *4* (1996Vy02). Jπ: 7/2+ consistent with δ(789γ) from ce and γ(θ,T).
952.667 *18*	(3/2+ to 9/2+)		
992.203 *10*	(3/2+ to 9/2+)		
1012.594 *10*	(5/2,7/2,9/2)		E(level): 1012.67 *7* (1996Vy02).
1097.591 *10*	(9/2)−		E(level): 1097.59 *4* (Jπ=7/2−,9/2−) (1996Vy02).
1165.04 *3*	(5/2,7/2,9/2)		
1207.72 *3*	(5/2,7/2,9/2)		
1220.56 *10*	5/2+		
1231.253 *9*	9/2−		E(level): 1231.27 *4* (1996Vy02).
1246.41 *5*	(5/2,7/2,9/2)		

† From the Adopted Levels.
‡ From least-squares fit to Eγ data.

ε,β+ radiations

E(decay)	E(level)	Iε†	Log *ft*	I(ε+β+)†	Comments
(68 *4*)	1246.41	0.0037 *3*	8.2 *1*	0.0037 *3*	εK=0.35 *8*; εL=0.48 *6*; εM+=0.170 *21*
(83 *4*)	1231.253	0.268 *15*	6.7 *1*	0.268 *15*	εK=0.52 *4*; εL=0.36 *3*; εM+=0.120 *10* I(ε+β+): other: 0.20 *2* (1996Vy02).
(93 *4*)	1220.56	0.0043 *6*	8.7 *1*	0.0043 *6*	εK=0.594 *23*; εL=0.305 *17*; εM+=0.101 *7*
(106 *4*)	1207.72	0.0045 *5*	8.8 *1*	0.0045 *5*	εK=0.647 *15*; εL=0.266 *11*; εM+=0.087 *4*
(149 *4*)	1165.04	0.0122 *8*	8.80 *5*	0.0122 *8*	εK=0.731 *5*; εL=0.204 *4*; εM+=0.0642 *13*
(216 *4*)	1097.591	1.18 *7*	7.24 *4*	1.18 *7*	εK=0.7779 *17*; εL=0.1701 *13*; εM+=0.0520 *5* I(ε+β+): other: 1.04 *6* (1996Vy02).
(301 *4*)	1012.594	0.202 *12*	8.35 *3*	0.202 *12*	εK=0.8010 *8*; εL=0.1530 *6*; εM+=0.04600 *19* I(ε+β+): other: 0.24 *4* (1996Vy02).
(322 *4*)	992.203	0.0374 *22*	9.14 *3*	0.0374 *22*	εK=0.8044 *7*; εL=0.1505 *5*; εM+=0.04512 *16*
(361 *4*)	952.667	0.079 *5*	8.93 *3*	0.079 *5*	εK=0.8096 *5*; εL=0.1466 *4*; εM+=0.04376 *13*
(375 *4*)	938.609	14.0 *8*	6.72 *3*	14.0 *8*	εK=0.8112 *5*; εL=0.1454 *4*; εM+=0.04335 *12* I(ε+β+): other: 14.3 *6* (1996Vy02).
(381 *4*)	933.119	0.88 *5*	7.94 *3*	0.88 *5*	εK=0.8118 *5*; εL=0.1450 *3*; εM+=0.04321 *11* I(ε+β+): other: 0.83 *6* (1996Vy02).
(438 *4*)	875.939	0.337 *19*	8.49 *3*	0.337 *19*	εK=0.8168 *3*; εL=0.14129 *23*; εM+=0.04191 *8*

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^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
						I(ε+β+): other: 0.58 *12* (1996Vy02).
(501 *4*)	812.631		0.264 *22*	8.72 *4*	0.264 *22*	εK=0.8208 *3*; εL=0.13828 *17*; εM+=0.04087 *6*
						I(ε+β+): other: 0.75 *6* (1996Vy02).
(515 *4*)	798.937		0.098 *9*	9.18 *4*	0.098 *9*	εK=0.8216 *2*; εL=0.13774 *16*; εM+=0.04068 *6*
(519 *4*)	795.030		33.0 *18*	6.66 *3*	33.0 *18*	εK=0.8218 *2*; εL=0.13759 *16*; εM+=0.04063 *6*
						I(ε+β+): other: 36.4 *15* (1996Vy02).
(537 *4*)	776.69		0.0147 *11*	10.04 *4*	0.0147 *11*	εK=0.8227 *2*; εL=0.13692 *15*; εM+=0.04040 *5*
(565 *4*)	748.601		8.6 *5*	7.32 *3*	8.6 *5*	εK=0.8239 *2*; εL=0.1360 *2*; εM+=0.04008 *5*
						I(ε+β+): other: 8.5 *4* (1996Vy02).
(648‡ *4*)	666.291		<0.1	>9.4	<0.1	εK=0.8269 *2*; εL=0.1338 *1*; εM+=0.03931 *4*
						I(ε+β+): other: 0.17 (1996Vy02).
(780 *4*)	534.295		1.05 *7*	8.54 *3*	1.05 *7*	εK=0.83028 *9*; εL=0.13127 *7*; εM+=0.03845 *3*
						I(ε+β+): other: 0.75 *24* (1996Vy02).
(818‡ *4*)	496.389		<0.3	>9.1	<0.3	εK=0.8310; εL=0.13071 *6*; εM+=0.03826 *2*
						I(ε+β+): other: 1.7 (1996Vy02).
(854 *4*)	459.826		0.220 *14*	9.30 *3*	0.220 *14*	εK=0.8317; εL=0.13022 *6*; εM+=0.03809 *2*
						I(ε+β+): other: 0.24 *5* (1996Vy02).
(1164 *4*)	149.732		34.2 *19*	7.39 *3*	34.2 *19*	εK=0.8355; εL=0.12736 *3*; εM+=0.03711 *1*
						I(ε+β+): other: 36 *6* (1996Vy02).
(1314 *4*)	0.0	<0.0033	<10.0	>8.0	<10	av Eβ=144.8 *19*; εK=0.8364; εL=0.12645 *3*; εM+=0.036793 *8*
						Iε: limit for g.s. feeding was obtained from γ-ray intensity balance and K x ray intensity (Iγ(K x ray)=211±16, relative to Iγ(149.9)=100, weighted average of 1975Al14,1970Ep01,1968Ad01,1962Pr06), with ω(K)=0.932 (1979Kr13) and εK/(ε+β+)=0.82. I(β+)/I(εK)<0.001 (1970Ep01). Other: 4 (1996Vy02).

† For absolute intensity per 100 decays, multiply by 0.999995 *1*.
‡ Existence of this branch is questionable.

γ(^{149}Eu)

Iγ normalization: Σ(I(γ+ce) to g.s.)=95 *5*, assuming Iε(g.s.)=5 *5*. See also comment on g.s. feeding.

Conversion coefficients under comments are deduced by evaluators from Iγ and I(ce) values as given under comments, with the latter being the weighted average of values from 1966Av05, 1966Ha23, 1974Ga13, 1975Al14, 1992Ca11, unless otherwise noted. The Iγ and Ice(K) values were normalized together to give α(K)exp=0.503 for the 149.7-keV transition, which is the theoretical value for an M1+E2 (δ=0.14 *3*) transition.

Following weak lines reported by different authors have been omitted for lack of confirmation in more recent work:

1966Av05 (from ce data): 58.68, 64.25, 72.9, 80.2, 86.9, 97.66, 102.6, 106.3, 112.8, 119.5, 119.8, 130.8, 143.0, 178.5, 296.6.

1966Ha23 (from ce data): 76.0, 76.6, 230.4, 235.1, 268.6, 316.9, 325.6, 401.8, 593.5, 613.8, 718.2, 1029.3.

1968Ad01 (from γ-ray data): 230.4, 235.1.

1975Se18 (from γ-ray data): 229.0, 238.5, 610.0.

K-x ray energies (intensities) (relative to Iγ=100 for 149.7γ) (1990Me15) are: 40.877 (60 *1*), 41.529 (107 *2*), 47.027 (34 *2*), 48.241 (9.2 *14*). Other measurements: 1996Vy02, 1975Al14, 1970Ep01, 1968Ad01, 1962Pr06.

E_γ †	I_γ @ *a*	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α *b*	Comments
*x*37.80 *15*								E_γ: the details of the observation of this transition in ce data (1975Al14 and 1966Ha23) are not available. Suggested placement (534 (J^π=7/2$^+$) to 496 (J^π=11/2$^-$)) seems suspect since with the required mult=M2, the deduced $T_{1/2}$(534 level)>1.7 μs (assuming RUL(M2)<1) is inconsistent with observed γγ coin involving 534γ where the resolving time may be typically 50 ns. I(γ+ce)=0.24 *4* (1975Al14).
82.33 *8*	0.011 *2*	748.601	7/2$^-$	666.291	9/2$^+$	[E1]	0.479 *7*	%Iγ=0.0053 *10* α(N)=0.00297 *4*; α(O)=0.000442 *6*; α(P)=3.26×10^{-5} *5* α(K)=0.401 *6*; α(L)=0.0614 *9*; α(M)=0.01324 *19* E_γ,I_γ: from 2006Ri11. E_γ: others: 82.50 *15* (1975Al14), 83.01 (1996Vy02). I_γ: others: 0.065 *15* (1975Al14), 0.06 *2* (1992Ca11), 0.11 *1* (1996Vy02).
125.98 *1*	0.303 *6*	938.609	7/2$^+$	812.631	5/2$^+$	E2,M1	1.01 *5*	%Iγ=0.147 *8* α(K)exp=0.46 *8*; α(K)exp=0.97 *6*; α(L1)exp=0.14 *4* α(K)=0.71 *10*; α(L)=0.23 *11*; α(M)=0.052 *27* α(N)=0.012 *6*; α(O)=0.0017 *8*; α(P)=6.8×10^{-5} *21* Eγ=125.99 *2* (2006Ri11), 125.98 *1* (1990Me15), 125.98 *2* (1987Ad02). Iγ=0.300 *6* (2006Ri11), 0.313 *10* (1990Me15), 0.250 *7* (1987Ad02). Value from 1987Ad02 not used in averaging. α(K)exp=0.46 *8* (ce(K) from 1975Al14,1966Av05), 0.97 *6* (ce(K) from 1992Ca11,1966Ha23). Mult=E2 from former and M1 from latter. Ice(K)=0.21 *4* (1966Av05), 0.26 *6* (1975Al14), 0.59 *9* (1966Ha23), 0.48 *2* (1992Ca11), Ice(L1)=0.07 (1966Ha23).
127.1 *c*	<0.003	875.939	5/2$^+$	748.601	7/2$^-$	[E1]	0.1483 *21*	%Iγ<0.00145 α(K)=0.1252 *18*; α(L)=0.01816 *25*; α(M)=0.00391 *5*

$^{149}_{63}Eu_{86}$-4

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ[†]	I_γ[@a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	α[b]	Comments
									α(N)=0.000882 *12*; α(O)=0.0001338 *19*; α(P)=1.080×10^{-5} *15* Eγ=127.1 *3*, Iγ=0.02 *1*, γ reported by 1975Al14 only. 2006Ri11 set an upper limit of 0.003.
128.74 *2*	0.077 *5*	795.030	9/2$^-$	666.291	9/2$^+$	E1+M2	0.18 *6*	0.36 *16*	%Iγ=0.0373 *31* α(K)exp=0.26 *11* α(K)=0.29 *12*; α(L)=0.056 *28*; α(M)=0.012 *6* α(N)=0.0029 *15*; α(O)=4.4×10^{-4} *23*; α(P)=3.7×10^{-5} *20* Eγ=128.74 *2* (2006Ri11), 128.75 *3* (1990Me15), 128.77 *11* (1987Ad02). Iγ=0.081 *7* (2006Ri11), 0.078 *5* (1990Me15), 0.069 *7* (1987Ad02). Ice(K)=0.039 *15*.
132.004 *10*	0.187 *10*	666.291	9/2$^+$	534.295	7/2$^+$	M1		0.837 *12*	%Iγ=0.091 *7* α(K)exp=0.88 *8*; α(L1)exp=0.16 *7*; α(L)exp=0.36 *12* α(K)=0.709 *10*; α(L)=0.1010 *14*; α(M)=0.02182 *31* α(N)=0.00500 *7*; α(O)=0.000793 *11*; α(P)=7.83×10^{-5} *11* Eγ=132.00 *1* (2006Ri11), 132.001 *9* (1990Me15), 132.06 *3* (1987Ad02). Iγ=0.187 *11* (2006Ri11), 0.186 *10* (1990Me15), 0.147 *8* (1987Ad02, seems discrepant, not used in averaging). Ice(K)=0.27 *2*, Ice(L1)=0.05 *2*, Ice(L)=0.11 *3*. (132γ)(534γ)(θ): A_2=+0.10 *6*, A_4=+0.15 *12* (1975Se18).
138.10 *1*	0.164 *12*	933.119	(9/2)$^+$	795.030	9/2$^-$	(E1+M2)	0.18 *4*	0.29 *8*	%Iγ=0.079 *7* α(K)exp=0.24 *6* (1975Al14); α(K)exp=0.42 *6*; α(L1)exp=0.11 *5* α(K)=0.23 *6*; α(L)=0.043 *14*; α(M)=0.0097 *31* α(N)=0.0022 *7*; α(O)=3.4×10^{-4} *11*; α(P)=2.9×10^{-5} *10* Eγ=138.10 *1* (2006Ri11), 138.09 *2* (1990Me15), 138.28 *4* (1987Ad02). Value from 1987Ad02 not used in averaging. Iγ=0.141 *8* (2006Ri11), 0.171 *15* (1990Me15), 0.181 *7* (1987Ad02): unweighted average. α(K)exp=0.42 *6* (using weighted average of Ice(K) values). α(K)exp=0.24 *6* gives E1+M2 while 0.42 *6* is consistent with E2. α(L1)exp gives E2 or E1+M2. Ice(K)=0.086 *27* (1975Al14), 0.17 *2* (1992Ca11), 0.20 *3* (1966Ha23) 0.15 *4* (1966Av05), Ice(L1)=0.04 *2* (1966Ha23).
139.74[#c] *8*	0.029[#] *3*	938.609	7/2$^+$	798.937	(9/2$^+$)				%Iγ=0.0140 *16*
149.730 *10*	100.0 *6*	149.732	7/2$^+$	0.0	5/2$^+$	M1+E2	0.14 *3*	0.587 *8*	%Iγ=48.4 *26* α(K)exp=0.48 *2* (1975Al14); α(L1)exp=0.062 *3*; α(L2)exp=0.0062 *7*; α(L3)exp=0.0016 *6* α(M)exp=0.023 *5*; α(M1)exp=0.017 *3*; α(N)exp=0.0046 *15*; α(K)exp=0.459 *15* (1996Vy02) α(K)=0.495 *7*; α(L)=0.0725 *13*; α(M)=0.01571 *30* α(N)=0.00359 *7*; α(O)=0.000567 *10*; α(P)=5.44×10^{-5} *8*

$^{149}_{63}Eu_{86}$-5

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	δ [&]	α [b]	Comments
									Eγ=149.72 *1* (2006Ri11), 149.736 *3* (1990Me15), 149.740 *14* (1987Ad02). Iγ=100.0 *6* (2006Ri11), 100.0 *7* (1990Me15), 100.0 *19* (1987Ad02). Ice(K)=100 *3*, Ice(L1)=12.3 *6*, Ice(L2)=1.24 *13*, Ice(L3)=0.32 *13*, Ice(M1)=3.5 *5*, Ice(M)=4.7 *10*, Ice(N)=0.91 *30*. δ: from L1:L2:L3=12.2 *6*:1.24 *13*:0.32 *12* (1966Av05,1966Ha23).
184.51 *1*	0.100 *4*	933.119	$(9/2)^+$	748.601	$7/2^-$	(E1+M2)	0.25 *5*	0.17 *4*	%Iγ=0.0484 *32* α(K)exp=0.14 *4*; α(K)exp=0.046 *5* α(K)=0.13 *4*; α(L)=0.024 *7*; α(M)=0.0054 *16* α(N)=0.0012 *4*; α(O)=1.9×10^{-4} *6*; α(P)=1.7×10^{-5} *5* Eγ=184.50 *2* (2006Ri11), 184.51 *1* (1990Me15), 184.52 *2* (1987Ad02). Iγ=0.108 *3* (2006Ri11), 0.0930 *34* (1990Me15), 0.099 *3* (1987Ad02): unweighted average. α(K)exp=0.14 *4* from ce(K) in 1975Al14), 0.46 *5* (from weighted averaged ce(K)). The former value gives E2 or E1+M2, while the latter (>than that for M1) is inconsistent with either mult. Ice(K)=0.027 *8* (1975Al14), 0.092 *9* (1992Ca11), 0.08 *2* (1966Ha23).
186.67 *4*	0.0201 *16*	1097.591	$(9/2)^-$	910.89	$11/2^+$	[E1]		0.0526 *7*	%Iγ=0.0097 *9* α(K)=0.0447 *6*; α(L)=0.00629 *9*; α(M)=0.001351 *19* α(N)=0.000306 *4*; α(O)=4.71×10^{-5} *7*; α(P)=4.04×10^{-6} *6* Eγ=186.63 *3* (2006Ri11), 186.729 *53* (1990Me15), 186.75 *7* (1987Ad02). Iγ=0.024 *4* (2006Ri11), 0.0206 *25* (1990Me15), 0.0192 *16* (1987Ad02).
189.7 [c]	<0.005	938.609	$7/2^+$	748.601	$7/2^-$	[E1]		0.0504 *7*	%Iγ<0.00242 α(K)=0.0428 *6*; α(L)=0.00602 *8*; α(M)=0.001293 *18* α(N)=0.000293 *4*; α(O)=4.51×10^{-5} *6*; α(P)=3.88×10^{-6} *5* Eγ=189.70 *20*, Iγ=0.02 *1*, γ reported by 1975Al14 only; not confirmed by 2006Ri11.
[x]196.93[‡]	<0.01								
[x]203.14[‡]	<0.003								
213.39[#c] *8*	0.009[#] *2*	1012.594	(5/2,7/2,9/2)	798.937	$(9/2^+)$				%Iγ=0.0044 *10* E_γ: poor fit in the level scheme, fitted value is 213.66 *2*.
214.275 *13*	0.403 *8*	748.601	$7/2^-$	534.295	$7/2^+$	(E1)		0.0365 *5*	%Iγ=0.195 *11* α(K)exp=0.09 *4* α(K)=0.0310 *4*; α(L)=0.00433 *6*; α(M)=0.000930 *13*

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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ †	I_γ @ *a*	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α *b*	Comments
								α(N)=0.0002109 *30*; α(O)=3.26×10^{-5} *5*; α(P)=2.85×10^{-6} *4* Eγ=214.28 *2* (2006Ri11), 214.28 (1990Me15), 214.268 *13* (1987Ad02). Uncertainty of 0.015 keV assumed in 1990Me15. Iγ=0.409 *11* (2006Ri11), 0.387 *10* (1990Me15), 0.409 *8* (1987Ad02). E1 or E2 from α(K)exp. Ice(K)=0.074 *38*. (214γ)(534γ)(θ): A_2=+0.11 *4*, A_4=+0.07 *10* (1975Se18).
x238.25‡	<0.003							Earlier placement from a 1050.8 level not supported by 2006Ri11.
x239.87‡	<0.003							
x248.64‡	<0.01							
252.210 *10*	0.560 *12*	748.601	7/2$^-$	496.389	11/2$^-$	E2	0.1006 *14*	%Iγ=0.271 *16* α(K)exp=0.085 *5* α(K)=0.0753 *11*; α(L)=0.01969 *28*; α(M)=0.00446 *6* α(N)=0.001000 *14*; α(O)=0.0001448 *20*; α(P)=6.77×10^{-6} *9* Eγ=252.19 *2* (2006Ri11), 252.222 *4* (1990Me15), 252.203 *8* (1987Ad02). Iγ=0.563 *11* (2006Ri11), 0.538 *10* (1990Me15), 0.580 *11* (1987Ad02): unweighted average. Mult.: δ(E2/M1)=2.5 *+33−8* from α(K)exp, but ΔJ^π requires E2. Ice(K)=0.095 *5*.
260.736 *10*	2.688 *29*	795.030	9/2$^-$	534.295	7/2$^+$	E1	0.02189 *31*	%Iγ=1.30 *7* α(K)exp=0.0182 *14* α(K)=0.01862 *26*; α(L)=0.00257 *4*; α(M)=0.000552 *8* α(N)=0.0001254 *18*; α(O)=1.946×10^{-5} *27*; α(P)=1.746×10^{-6} *24* Eγ=260.73 *3* (2006Ri11), 260.737 *6* (1990Me15), 260.735 *6* (1987Ad02). Iγ=2.69 *5* (2006Ri11), 2.687 *29* (1990Me15), 2.69 *5* (1987Ad02). α(K)exp gives δ(M2/E1)<0.05. Ice(K)=0.099 *6*. (261γ)(534γ)(θ): A_2=−0.110 *25*, A_4=+0.07 *5* (1975Se18). γ(θ,T): 1987Kr11.
264.66 *4*	0.080 *9*	798.937	(9/2$^+$)	534.295	7/2$^+$	(M1)	0.1229 *17*	%Iγ=0.039 *5* α(K)exp=0.20 *5* α(K)=0.1043 *15*; α(L)=0.01464 *20*; α(M)=0.00316 *4* α(N)=0.000723 *10*; α(O)=0.0001149 *16*; α(P)=1.145×10^{-5} *16* Eγ=264.60 *4* (2006Ri11), 264.63 *3* (1990Me15), 264.72 *3* (1987Ad02). Iγ=0.081 *4* (2006Ri11), 0.064 *5* (1990Me15), 0.095 *3* (1987Ad02): unweighted average. α(K)exp marginally agrees with M1. Ice(K)=0.035 *10*. Placement from 1013 level in 1975Al14 is not supported by 1987Ad02 and 2006Ri11, and from level energy difference.
266.91 *7*	0.050 *14*	933.119	(9/2)$^+$	666.291	9/2$^+$	(M1,E2)	0.102 *18*	%Iγ=0.024 *7* α(K)exp≈0.16 α(K)=0.083 *19*; α(L)=0.0151 *8*; α(M)=0.00334 *26*

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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	δ [&]	α [b]	Comments
									α(N)=0.00076 *5*; α(O)=0.0001148 *30*; α(P)=8.5×10^{-6} *27* Eγ=266.82 *6* (2006Ri11), 266.97 *5* (1987Ad02). Iγ=0.036 *3* (2006Ri11), 0.063 *3* (1987Ad02): unweighted average. Ice(K)≈0.02.
[x]270.79[‡]	<0.01								
272.320 *10*	6.66 *10*	938.609	7/2$^+$	666.291	9/2$^+$	M1+E2	0.33 *+12−8*	0.1104 *29*	%Iγ=3.22 *18* α(K)exp=0.098 *8*; α(L1)exp=0.0135 *14*; α(L2)exp=0.0012 *3*; α(L3)exp≤0.00055 α(M1)exp=0.0030 *15* α(K)=0.0930 *29*; α(L)=0.01367 *21*; α(M)=0.00296 *5* α(N)=0.000677 *11*; α(O)=0.0001066 *15*; α(P)=1.01×10^{-5} *4* Eγ=272.32 *3* (2006Ri11), 272.317 *5* (1990Me15), 272.322 *6* (1987Ad02). Iγ=6.61 *13* (2006Ri11), 6.66 *10* (1990Me15), 6.69 *13* (1987Ad02). δ: from experimental α values above, and L1:L2:L3=0.18 *2*:0.016 *4*:0.0073 (1966Av05), using the BrIccMixing program. Ice(K)=1.30 *4*, Ice(L1)=0.18 *2*, Ice(L2)=0.016 *4*, Ice(L3)≤0.0073, Ice(M1)=0.04 *2*. (272γ)(666γ)(θ): A$_2$=+0.143 *24*, A$_4$=+0.013 *20* (1985Be64).
278.31 *3*	0.164 *21*	812.631	5/2$^+$	534.295	7/2$^+$	[M1,E2]		0.090 *17*	%Iγ=0.079 *11* α(K)=0.074 *18*; α(L)=0.0132 *5*; α(M)=0.00291 *16* α(N)=0.000661 *31*; α(O)=0.0001004 *14*; α(P)=7.6×10^{-6} *24* Eγ=278.34 *2* (2006Ri11), 278.28 *2* (1990Me15). Iγ=0.185 *6* (2006Ri11), 0.143 *3* (1990Me15): unweighted average. (278γ)(534γ)(θ): A$_2$=−0.160 *20*, A$_4$=−0.035 *30* (1975Se18).
[x]292.86[‡]	<0.01								
298.633 *10*	57.72 *29*	795.030	9/2$^-$	496.389	11/2$^-$	M1+E2	+0.15 *2*	0.0884 *13*	%Iγ=27.9 *15* α(K)exp=0.073 *4*; α(L1)exp=0.0095 *12*; α(L2)exp=0.00061 *16*; α(L3)exp≤0.00013 α(K)exp=0.0723 *20* (1996Vy02) α(K)=0.0749 *11*; α(L)=0.01057 *15*; α(M)=0.002281 *32* α(N)=0.000522 *7*; α(O)=8.28×10^{-5} *12*; α(P)=8.19×10^{-6} *12* Eγ=298.63 *1* (2006Ri11), 298.634 *5* (1990Me15), 298.634 *10* (1987Ad02). Iγ=57.9 *6* (2006Ri11), 57.66 *24* (1990Me15), 57.9 *10* (1987Ad02). Ice(K)=8.6 *3*, Ice(L1)=1.13 *11*, Ice(L2)=0.073 *18*, Ice(L3)≤0.015. δ: from γ(θ,T) (1987Be33). Others: +0.15 *3* (1986Va16),

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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	α[b]	Comments
									+0.11 *3* (quoted by 1986Va16 from another work). Combining experimental α values above and L1:L2:L3=1.13 *11*:0.073 *18*:0.015 gives δ<0.35.
302.58[#c] *3*	0.026[#] *4*	798.937	(9/2$^+$)	496.389	11/2$^-$				%Iγ=0.0126 *20*
341.65 *5*	0.158 *11*	875.939	5/2$^+$	534.295	7/2$^+$	[M1,E2]		0.051 *12*	%Iγ=0.076 *7* α(K)=0.042 *11*; α(L)=0.0070 *4*; α(M)=0.00153 *7* α(N)=0.000347 *18*; α(O)=5.3×10^{-5} *5*; α(P)=4.4×10^{-6} *14* Eγ=341.66 *5* (2006Ri11), 341.65 *6* (1990Me15), 341.65 *5* (1987Ad02). Iγ=0.136 *17* (2006Ri11), 0.157 *15* (1990Me15), 0.167 *11* (1987Ad02).
[x]346.30	0.15 *5*								%Iγ=0.073 *25* γ from 1990Me15 only. Note that this γ is just to left of the third most intense 346.65-keV γ in this decay. No such γ is confirmed by 2006Ri11.
346.650 *10*	49.0 *3*	496.389	11/2$^-$	149.732	7/2$^+$	M2+E3	−0.075 *25*	0.2326 *33*	%Iγ=23.7 *13* α(K)exp=0.202 *8*; α(L1)exp=0.031 *3*; α(L2)exp=0.0022 *4*; α(L3)exp=0.00016 *7* α(M1)exp=0.007 *2*; α(K)exp=0.187 *6* (1996Vy02) α(K)=0.1910 *27*; α(L)=0.0325 *5*; α(M)=0.00718 *10* α(N)=0.001648 *23*; α(O)=0.000259 *4*; α(P)=2.429×10^{-5} *35* Eγ=346.66 *3* (2006Ri11), 346.651 *3* (1990Me15), 346.648 *5* (1987Ad02). Iγ=49.8 *5* (2006Ri11), 48.80 *15* (1990Me15), 49.1 *8* (1987Ad02). Mult.: from L1:L2:L3=3.2 *3*:0.21 *4*:0.016 *7* (1966Av05). Ice(K)=19.9 *6*, Ice(L1)=3.0 *3*, Ice(L2)=0.21 *4*, Ice(L3)=0.016 *7*, Ice(M1)=0.7 *2*. δ: from γ(θ,T) (1987Be33). Other: −0.08 *+11−5* (1986Va16). ce data consistent with pure M2. (347γ)(150γ)(θ): A_2=−0.009 *19*, A_4=−0.011 *23* (1962Pr06).
349.04 *10*	0.136 *13*	1097.591	(9/2)$^-$	748.601	7/2$^-$	[M1,E2]		0.048 *12*	%Iγ=0.066 *7* α(K)=0.040 *11*; α(L)=0.0065 *5*; α(M)=0.00143 *8* α(N)=0.000325 *20*; α(O)=5.0×10^{-5} *5*; α(P)=4.1×10^{-6} *14* Eγ=349.12 *10* (2006Ri11), 348.96 *10* (1990Me15). Iγ=0.133 *10* (2006Ri11), 0.20 *5* (1990Me15). Ice(K)=0.012 *4*.
352.80 *2*	0.084 *6*	812.631	5/2$^+$	459.826	(3/2,5/2)$^+$	[M1,E2]		0.046 *11*	%Iγ=0.041 *4* α(K)=0.038 *10*; α(L)=0.0063 *5*; α(M)=0.00138 *8* α(N)=0.000315 *20*; α(O)=4.8×10^{-5} *5*; α(P)=4.0×10^{-6} *13*

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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	α [b]	Comments
								Eγ=352.79 *5* (2006Ri11), 352.81 *2* (1990Me15), 352.72 *9* (1987Ad02). Iγ=0.074 *9* (2006Ri11), 0.088 *15* (1990Me15), 0.088 *6* (1987Ad02).
[x]372.62[‡]	<0.003							Earlier placement from a 869 level not supported by 2006Ri11.
384.539 *10*	0.157 *4*	534.295	7/2$^+$	149.732	7/2$^+$	[M1,E2]	0.037 *9*	%Iγ=0.076 *4* α(K)=0.031 *8*; α(L)=0.0049 *5*; α(M)=0.00107 *10* α(N)=0.000243 *23*; α(O)=3.8×10^{-5} *5*; α(P)=3.2×10^{-6} *11* Eγ=384.54 *2* (2006Ri11), 384.52 *2* (1990Me15), 384.545 *12* (1987Ad02). Iγ=0.154 *4* (2006Ri11), 0.157 *5* (1990Me15), 0.160 *4* (1987Ad02).
[x]394.59[‡]	<0.002							
398.82 *1*	0.0925 *23*	933.119	(9/2)$^+$	534.295	7/2$^+$	[M1,E2]	0.033 *8*	%Iγ=0.0448 *26* α(K)=0.028 *8*; α(L)=0.0044 *5*; α(M)=0.00096 *10* α(N)=0.000219 *24*; α(O)=3.4×10^{-5} *5*; α(P)=2.9×10^{-6} *10* Eγ=398.82 *3* (2006Ri11), 398.77 *3* (1990Me15), 398.82 *1* (1987Ad02). Iγ=0.092 *3* (2006Ri11), 0.088 *5* (1990Me15), 0.0937 *23* (1987Ad02).
[x]400.20[‡]	<0.002							
404.299 *10*	0.408 *5*	938.609	7/2$^+$	534.295	7/2$^+$	M1,E2	0.032 *8*	%Iγ=0.198 *11* α(K)=0.027 *7*; α(L)=0.0042 *5*; α(M)=0.00092 *10* α(N)=0.000210 *24*; α(O)=3.3×10^{-5} *5*; α(P)=2.8×10^{-6} *9* Eγ=404.32 *3* (2006Ri11), 404.294 *5* (1990Me15), 404.302 *9* (1987Ad02). Iγ=0.402 *5* (2006Ri11), 0.416 *10* (1990Me15), 0.413 *6* (1987Ad02). α(K)exp=0.011 *4* (ce(K) from 1975Al14), 0.032 *12* (ce(K) from 1966Ha23). Ice(K)=0.0086 *26* (1975Al14), 0.026 *10* (1966Ha23). (404γ)(534γ)(θ): A_2=+0.11 *7*, A_4=+0.11 *10* (1975Se18). (404γ)(534γ)(θ): A_2=−0.11 *5*, A_4=+0.025 *18* (1985Be64).
416.08 *3*	0.0486 *15*	875.939	5/2$^+$	459.826	(3/2,5/2)$^+$	[M1,E2]	0.030 *8*	%Iγ=0.0235 *14* α(K)=0.025 *7*; α(L)=0.0039 *5*; α(M)=0.00085 *10* α(N)=0.000193 *24*; α(O)=3.0×10^{-5} *5*; α(P)=2.6×10^{-6} *9* Eγ=416.09 *4* (2006Ri11), 416.04 *3* (1990Me15), 416.11 *3* (1987Ad02). Iγ=0.048 *3* (2006Ri11), 0.045 *4* (1990Me15), 0.0493 *15* (1987Ad02).
418.56 *21*	0.0106 *13*	952.667	(3/2$^+$ to 9/2$^+$)	534.295	7/2$^+$			%Iγ=0.0051 *7* Eγ=418.35 *4* (2006Ri11), 418.77 *13* (1987Ad02): unweighted

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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	α [b]	Comments
								average. Iγ=0.010 *2* (2006Ri11), 0.0108 *13* (1987Ad02).
[x]419.47 *15*	0.006 *2*							%Iγ=0.0029 *10* E_γ,I_γ: from 2006Ri11 only, possible assignment to the decay of ^{149}Gd.
421.59 *18*	0.0072 *11*	1220.56	5/2$^+$	798.937	(9/2$^+$)	[E2]	0.02131 *30*	%Iγ=0.0035 *6* α(K)=0.01716 *24*; α(L)=0.00325 *5*; α(M)=0.000720 *10* α(N)=0.0001627 *23*; α(O)=2.447×10^{-5} *34*; α(P)=1.678×10^{-6} *24* Eγ=421.55 *20* (2006Ri11), 421.63 *18* (1987Ad02). Iγ=0.010 *5* (2006Ri11), 0.0071 *11* (1987Ad02).
[x]429.73[‡]	<0.002							
431.297 *12*	0.146 *3*	1097.591	(9/2)$^-$	666.291	9/2$^+$	E1	0.00633 *9*	%Iγ=0.071 *4* α(K)exp=0.010 *5* α(K)=0.00541 *8*; α(L)=0.000728 *10*; α(M)=0.0001561 *22* α(N)=3.56×10^{-5} *5*; α(O)=5.57×10^{-6} *8*; α(P)=5.26×10^{-7} *7* Eγ=431.30 *2* (2006Ri11), 431.294 *12* (1990Me15), 431.298 *12* (1987Ad02). Iγ=0.145 *4* (2006Ri11), 0.142 *10* (1990Me15), 0.147 *3* (1987Ad02). α(K)exp gives δ(M2/E1)<0.3. Ice(K)=0.0031 *16*.
436.24 *3*	0.091 *4*	1231.253	9/2$^-$	795.030	9/2$^-$	(M1)	0.0331 *5*	%Iγ=0.0441 *30* α(K)=0.0281 *4*; α(L)=0.00388 *5*; α(M)=0.000837 *12* α(N)=0.0001917 *27*; α(O)=3.05×10^{-5} *4*; α(P)=3.06×10^{-6} *4* E_γ,I_γ: from 2006Ri11, as individual values for the doublet at this energy are given. In other references, values are for an unresolved doublet. Eγ=436.24 *3* (2006Ri11). Others: 436.36 *2* (1990Me15), 436.37 *1* (1987Ad02) for unresolved doublet. Iγ=0.091 *4* (2006Ri11). Others: 0.132 *5* (1990Me15), 0.132 *3* (1987Ad02) for unresolved doublet. Mult.: α(K)exp=0.046 *16* for the doublet is consistent with M1 for the main placement with 1231 level. Ice(K)=0.012 *4*.
436.62 *17*	0.043 *6*	933.119	(9/2)$^+$	496.389	11/2$^-$			%Iγ=0.0208 *31* E_γ,I_γ: from 2006Ri11, as individual values for the doublet at this energy are given. In other references, values are for an unresolved doublet. Eγ=436.62 *17* (2006Ri11). Others: 436.36 *2* (1990Me15), 436.37 *1* (1987Ad02) for unresolved doublet. Iγ=0.043 *6* (2006Ri11). Others: 0.132 *5* (1990Me15), 0.132 *3* (1987Ad02) for unresolved doublet.
[x]447.42[‡]	<0.01							
[x]456.77 *3*	0.0495 *21*							%Iγ=0.0240 *16* Eγ=456.74 *4* (2006Ri11), 456.75 *4* (1990Me15), 456.80 *3* (1987Ad02). Iγ=0.048 *6* (2006Ri11), 0.044 *5* (1990Me15), 0.0506 *21* (1987Ad02).

$^{149}_{63}Eu_{86}$-11

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	δ [&]	α [b]	Comments
459.819 *10*	1.208 *10*	459.826	(3/2,5/2)$^+$	0.0	5/2$^+$	M1(+E2)	<0.4	0.0281 *9*	%Iγ=0.585 *31* α(K)exp=0.025 *2* α(K)=0.0238 *8*; α(L)=0.00333 *8*; α(M)=0.000717 *16* α(N)=0.000164 *4*; α(O)=2.60×10^{-5} *7*; α(P)=2.58×10^{-6} *10* Eγ=459.84 *2* (2006Ri11), 459.812 *4* (1990Me15), 459.821 *8* (1987Ad02). Iγ=1.224 *22* (2006Ri11), 1.199 *10* (1990Me15), 1.222 *17* (1987Ad02). Ice(K)=0.060 *4*.
478.27 *10*	0.047 *8*	1012.594	(5/2,7/2,9/2)	534.295	7/2$^+$				%Iγ=0.023 *4* E_γ,I_γ: from 2006Ri11, as individual values for the doublet at this energy are given. In other references, values are for an unresolved doublet. See comments for 478.78γ for data from 1990Me15 and 1987Ad02. Eγ=478.29 *6* in ce spectrum (1975Al14), but it is not clear how the authors resolved the two components of a doublet at this energy. Ice(K)=0.0047 *25*.
478.78 *2*	0.424 *6*	938.609	7/2$^+$	459.826	(3/2,5/2)$^+$	E2(+M1)	>4	0.0153 *4*	%Iγ=0.205 *11* α(K)exp=0.011 *2* α(K)=0.01253 *34*; α(L)=0.00221 *4*; α(M)=0.000487 *9* α(N)=0.0001103 *20*; α(O)=1.675×10^{-5} *32*; α(P)=1.25×10^{-6} *4* E_γ,I_γ: from 2006Ri11, as individual values for the doublet at this energy are given. In other references, values are for an unresolved doublet. Eγ=478.78 *2* (2006Ri11), 478.71 *1* (1990Me15), 478.710 *8* (1987Ad02). Iγ=0.424 *6* (2006Ri11), 0.475 *10* (1990Me15), 0.473 *8* (1987Ad02). Ice(K)=0.010 *2*.
482.640 *12*	0.155 *3*	1231.253	9/2$^-$	748.601	7/2$^-$	M1(+E2)	<2	0.021 *4*	%Iγ=0.075 *4* α(K)exp=0.021 *7* α(K)=0.018 *4*; α(L)=0.00265 *35*; α(M)=0.00057 *7* α(N)=0.000131 *17*; α(O)=2.05×10^{-5} *29*; α(P)=1.9×10^{-6} *5* Eγ=482.66 *2* (2006Ri11), 482.63 *2* (1990Me15), 482.636 *12* (1987Ad02). Iγ=0.155 *3* (2006Ri11), 0.157 *10* (1990Me15), 0.155 *4* (1987Ad02). Ice(K)=0.0066 *20*.
492.88 *6*	0.0367 *25*	952.667	(3/2$^+$ to 9/2$^+$)	459.826	(3/2,5/2)$^+$				%Iγ=0.0178 *15*

$^{149}_{63}Eu_{86}$-12

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ †	I_γ @ a	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	δ &	α b	Comments
496.385 *10*	3.424 *17*	496.389	11/2$^-$	0.0	5/2$^+$	E3		0.0392 *5*	Eγ=492.93 *6* (2006Ri11), 492.81 *7* (1987Ad02). Iγ=0.034 *3* (2006Ri11), 0.0385 *25* (1987Ad02). %Iγ=1.66 *9* α(K)exp=0.0274 *18*; α(L1)exp=0.0035 *6*; α(L2)exp=0.0035 *6*; α(L3)exp=0.00075 *37* α(M1)exp=0.0018 *6* α(K)=0.0289 *4*; α(L)=0.00797 *11*; α(M)=0.001818 *25* α(N)=0.000410 *6*; α(O)=6.02×10^{-5} *8*; α(P)=3.08×10^{-6} *4* Eγ=496.41 *2* (2006Ri11), 496.383 *2* (1990Me15), 496.380 *7* (1987Ad02). Iγ=3.35 *6* (2006Ri11), 3.431 *15* (1990Me15), 3.41 *5* (1987Ad02). Mult.: from L1:L2:L3=0.024 *4*:0.024 *6*:0.0051 *25* (1966Av05). Ice(K)=0.188 *10*, Ice(L1)=0.024 *4*, Ice(L2)=0.024 *6*, Ice(L3)=0.0051 *25*, Ice(M1)=0.012 *4*.
x502.12‡	<0.002								
516.550 *10*	5.58 *8*	666.291	9/2$^+$	149.732	7/2$^+$	M1+E2	0.75 *+27−24*	0.0182 *14*	%Iγ=2.70 *15* α(K)exp=0.0153 *7*; α(L1)exp=0.0025 *7*; α(M1)exp=0.0006 *2*; α(L)exp=0.0018 *4* α(K)=0.0153 *13*; α(L)=0.00223 *12*; α(M)=0.000484 *25* α(N)=0.000110 *6*; α(O)=1.74×10^{-5} *10*; α(P)=1.63×10^{-6} *15* Eγ=516.57 *2* (2006Ri11), 516.545 *2* (1990Me15), 516.549 *7* (1987Ad02). Iγ=5.58 *10* (2006Ri11), 5.53 *10* (1990Me15), 5.60 *8* (1987Ad02). I_γ: 6.28 *6* (1975Al14) is not used in averaging. Ice(K)=0.170 *5*, Ice(L1)=0.028 *7*, Ice(M1)=0.007 *2*, Ice(L)=0.020 *4*. (516γ)(150γ)(θ): A_2=−0.120 *20*, A_4=+0.024 *25* (1975Se18).
x522.12‡	<0.002								
x527.92‡	<0.003								
534.294 *10*	6.44 *5*	534.295	7/2$^+$	0.0	5/2$^+$	M1(+E2)	<0.4	0.0192 *6*	%Iγ=3.12 *17* α(K)exp=0.0176 *12*; α(L1)exp=0.0021 *6*; α(M1)exp=0.00047 *15* α(K)=0.0163 *6*; α(L)=0.00225 *6*; α(M)=0.000486 *12* α(N)=0.0001112 *29*; α(O)=1.77×10^{-5} *5*; α(P)=1.76×10^{-6} *7* Eγ=534.31 *2* (2006Ri11), 534.296 *4* (1990Me15), 534.288 *8* (1987Ad02). Iγ=6.49 *12* (2006Ri11), 6.41 *5* (1990Me15), 6.5 *1* (1987Ad02). Ice(K)=0.224 *12*, Ice(L1)=0.027 *7*, Ice(M1)=0.006 *2*, Ice(L)=0.020 *4*.

$^{149}_{63}Eu_{86}$-13

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	α[b]	Comments
552.761 *16*	0.177 *5*	1012.594	(5/2,7/2,9/2)	459.826	(3/2,5/2)$^+$	(E2(+M1))	>0.4	0.0137 *34*	%Iγ=0.086 *5* α(K)exp=0.011 *4* α(K)=0.0115 *30*; α(L)=0.00172 *30*; α(M)=0.00037 *6* α(N)=8.5×10^{-5} *14*; α(O)=1.33×10^{-5} *25*; α(P)=1.21×10^{-6} *35* Eγ=552.76 *2* (2006Ri11), 552.75 *2* (1990Me15), 552.768 *16* (1987Ad02). Iγ=0.156 *5* (2006Ri11), 0.171 *10* (1990Me15), 0.181 *5* (1987Ad02). α(K)exp gives E2(+M1) with δ>0.4 or E1+M2 with δ=0.47 *15*; the latter value seems less probable due to significant M2 mixture. Ice(K)=0.0039 *16*.
563.49 *10*	0.0219 *22*	1097.591	(9/2)$^-$	534.295	7/2$^+$	[E1]		0.00346 *5*	%Iγ=0.0106 *12* α(K)=0.00296 *4*; α(L)=0.000393 *6*; α(M)=8.42×10^{-5} *12* α(N)=1.920×10^{-5} *27*; α(O)=3.02×10^{-6} *4*; α(P)=2.91×10^{-7} *4* Eγ=563.58 *25* (2006Ri11), 563.48 *10* (1987Ad02). Iγ=0.024 *4* (2006Ri11), 0.0212 *22* (1987Ad02).
x574.88‡	<0.002								
x577.96‡	<0.002								
x581.79‡	<0.002								
x590.96‡	<0.002								Earlier placement from a 1050.8 level not supported by 2006Ri11.
x593.16‡	<0.002								
598.89 *5*	0.0415 *29*	748.601	7/2$^-$	149.732	7/2$^+$				%Iγ=0.0201 *18* Eγ=598.84 *4* (2006Ri11), 598.94 *4* (1987Ad02). Iγ=0.047 *7* (2006Ri11), 0.0400 *21* (1987Ad02).
601.201 *15*	0.1221 *26*	1097.591	(9/2)$^-$	496.389	11/2$^-$	(M1)		0.01468 *21*	%Iγ=0.0591 *34* α(K)exp=0.016 *3* α(K)=0.01251 *18*; α(L)=0.001708 *24*; α(M)=0.000367 *5* α(N)=8.42×10^{-5} *12*; α(O)=1.340×10^{-5} *19*; α(P)=1.353×10^{-6} *19* Eγ=601.21 *3* (2006Ri11), 601.206 (1990Me15), 601.196 *15* (1987Ad02). Uncertainty of 0.020 keV assumed in 1990Me15. Iγ=0.126 *7* (2006Ri11), 0.122 *5* (1990Me15), 0.1216 *26* (1987Ad02). α(K)exp: ce(K) may be composite of 599γ and 601γ. Ice(K)=0.0039 *8* (probably for both 599γ and 601γ).

$^{149}_{63}Eu_{86}$-14

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ †	I_γ @ a	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	δ &	α b	Comments
x629.01 ‡	<0.001								
645.315 *10*	3.043 *19*	795.030	9/2⁻	149.732	7/2⁺	E1		0.00259 *4*	%Iγ=1.47 *8* α(K)exp=0.0023 *3* α(K)=0.002214 *31*; α(L)=0.000292 *4*; α(M)=6.26×10⁻⁵ *9* α(N)=1.427×10⁻⁵ *20*; α(O)=2.251×10⁻⁶ *32*; α(P)=2.192×10⁻⁷ *31* Eγ=645.31 *1* (2006Ri11), 645.315 *2* (1990Me15), 645.309 *7* (1987Ad02). Iγ=3.12 *4* (2006Ri11), 3.035 *15* (1990Me15), 3.02 *4* (1987Ad02). α(K)exp gives δ(M2/E1)<0.12. Ice(K)=0.014 *2*. (645γ)(150γ)(θ): A_2=+0.13 *3*, A_4=−0.08 *6* (1975Se18). γ(θ,T) data: 1987Kr11.
649.11 *7*	0.028 *5*	798.937	(9/2⁺)	149.732	7/2⁺	[M1,E2]		0.0095 *26*	%Iγ=0.0136 *25* α(K)=0.0080 *23*; α(L)=0.00116 *25*; α(M)=0.00025 *5* α(N)=5.7×10⁻⁵ *12*; α(O)=9.0×10⁻⁶ *20*; α(P)=8.5×10⁻⁷ *27* Eγ=649.15 *7* (2006Ri11), 649.06 *8* (1987Ad02). Iγ=0.033 *4* (2006Ri11), 0.0223 *16* (1987Ad02); unweighted average.
662.902 *10*	0.579 *10*	812.631	5/2⁺	149.732	7/2⁺	M1(+E2)	<0.85	0.0105 *10*	%Iγ=0.280 *16* α(K)exp=0.011 *3* α(K)=0.0089 *9*; α(L)=0.00124 *10*; α(M)=0.000267 *21* α(N)=6.1×10⁻⁵ *5*; α(O)=9.7×10⁻⁶ *8*; α(P)=9.5×10⁻⁷ *11* Eγ=662.91 *1* (2006Ri11), 662.89 *1* (1990Me15), 662.905 *10* (1987Ad02). Iγ=0.568 *10* (2006Ri11), 0.578 *10* (1990Me15), 0.594 *11* (1987Ad02). Ice(K)=0.013 *3*.
666.289 *10*	1.811 *13*	666.291	9/2⁺	0.0	5/2⁺	E2		0.00649 *9*	%Iγ=0.88 *5* α(K)exp=0.0062 *9*; α(L1)exp=0.0084 *28* α(K)=0.00540 *8*; α(L)=0.000853 *12*; α(M)=0.0001861 *26* α(N)=4.23×10⁻⁵ *6*; α(O)=6.54×10⁻⁶ *9*; α(P)=5.49×10⁻⁷ *8* Eγ=666.29 *1* (2006Ri11), 666.290 *4* (1990Me15), 666.286 *6* (1987Ad02). Iγ=1.853 *22* (2006Ri11), 1.801 *10* (1990Me15), 1.822 *28* (1987Ad02). Mult.,δ: from ce data δ(E2/M1)>1.3; from γ(θ) in (p,4nγ) mult=Q. Ice(K)=0.022 *3*, Ice(L1)=0.003 *1*.
x672.37 ‡	<0.001								
673.43 *3*	0.0070 *9*	1207.72	(5/2,7/2,9/2)	534.295	7/2⁺				%Iγ=0.0034 *5*

$^{149}_{63}Eu_{86}$-15

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ †	I_γ @ a	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	δ &	α b	Comments
									Eγ=673.43 *2* (2006Ri11), 673.65 *15* (1987Ad02). Iγ=0.0076 *12* (2006Ri11), 0.0067 *9* (1987Ad02).
x688.27 ‡	<0.003								
x711.72 ‡	<0.001								
x715.21 ‡	<0.001								
x719.19 ‡	<0.002								Earlier placement from a 869 level not supported by 2006Ri11.
726.21 *1*	0.165 *5*	875.939	5/2+	149.732	7/2+	M1(+E2)	<0.65	0.0086 *6*	%Iγ=0.080 *5* α(K)exp=0.010 *3* α(K)=0.0073 *5*; α(L)=0.00101 *6*; α(M)=0.000217 *12* α(N)=4.97×10^{-5} *29*; α(O)=7.9×10^{-6} *5*; α(P)=7.9×10^{-7} *6* Eγ=726.23 *2* (2006Ri11), 726.16 *4* (1990Me15), 726.21 *1* (1987Ad02). Iγ=0.168 *6* (2006Ri11), 0.166 *10* (1990Me15), 0.162 *5* (1987Ad02). Ice(K)=0.0033 *8*.
734.86 *1*	0.264 *6*	1231.253	9/2−	496.389	11/2−	M1(+E2)	<2	0.0074 *15*	%Iγ=0.128 *7* α(K)exp=0.0071 *22* α(K)=0.0063 *13*; α(L)=0.00088 *15*; α(M)=0.000191 *31* α(N)=4.4×10^{-5} *7*; α(O)=6.9×10^{-6} *12*; α(P)=6.7×10^{-7} *15* Eγ=734.85 *3* (2006Ri11), 734.84 *2* (1990Me15), 734.87 *1* (1987Ad02). Iγ=0.262 *8* (2006Ri11), 0.274 *10* (1990Me15), 0.261 *6* (1987Ad02). Ice(K)=0.0037 *11*.
x738.66 ‡	<0.002								
748.604 *10*	17.09 *20*	748.601	7/2−	0.0	5/2+	E1+M2	+0.041 *13*	0.00194 *4*	%Iγ=8.3 *4* α(K)exp=0.0015 *2* α(K)=0.001661 *32*; α(L)=0.000218 *5*; α(M)=4.67×10^{-5} *10* α(N)=1.067×10^{-5} *22*; α(O)=1.685×10^{-6} *35*; α(P)=1.657×10^{-7} *35* Eγ=748.62 *2* (2006Ri11), 748.601 *2* (1990Me15), 748.603 *8* (1987Ad02). Iγ=17.19 *20* (2006Ri11), 16.94 *26* (1990Me15), 17.08 *27* (1987Ad02). α(K)exp gives δ(M2/E1)<0.1. Ice(K)=0.051 *7*. δ: from γ(θ,T) (1986Va16). Others: +0.034 *21* (quoted by 1986Va16 from another work), 1987Kr11.
x756.42 ‡	<0.003								
761.12 *5*	0.0167 *10*	910.89	11/2+	149.732	7/2+				%Iγ=0.0081 *6*

$^{149}_{63}Eu_{86}$-16

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ †	I_γ @ *a*	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	δ&	α *b*	Comments
776.69 *10*	0.0304 *14*	776.69	(3/2 to 9/2)	0.0	5/2$^+$				Eγ=761.10 *3* (2006Ri11), 761.22 *6* (1987Ad02). Iγ=0.017 *1* (2006Ri11), 0.0156 *19* (1987Ad02). %Iγ=0.0147 *10* Eγ=776.59 *5* (2006Ri11), 776.78 *4* (1987Ad02): unweighted average. Iγ=0.033 *3* (2006Ri11), 0.0298 *14* (1987Ad02). Other: 0.035 *7* (1996Vy02).
783.45#*c* *10*	0.016# *2*	933.119	(9/2)$^+$	149.732	7/2$^+$				%Iγ=0.0077 *11*
788.875 *10*	15.15 *15*	938.609	7/2$^+$	149.732	7/2$^+$	E2+M1	−5 *2*	0.00451 *20*	%Iγ=7.3 *4* α(K)exp=0.0035 *3*; α(L1)exp=0.0006 *2*; α(L)exp=0.0012 *6*; α(M1)exp=0.00015 *5* α(K)=0.00378 *18*; α(L)=0.000566 *21*; α(M)=0.000123 *4* α(N)=2.80×10^{-5} *10*; α(O)=4.36×10^{-6} *17*; α(P)=3.89×10^{-7} *20* Eγ=788.87 *2* (2006Ri11), 788.878 (1990Me15), 788.873 *8* (1987Ad02). Uncertainty assumed as 0.010 keV in 1990Me15. Iγ=15.11 *22* (2006Ri11), 15.12 *15* (1990Me15), 15.32 *26* (1987Ad02). δ: from γ(θ,T) (1987Be33). Others: +0.43 *6* (1987Be33 for 5/2 to 7/2 transition), >5 (from ce data). δ from γγ(θ) data is not deduced due to large discrepancy in A_2 values from 1985Be64 and 1975Se18. Ice(K)=0.106 *7*, Ice(L1)=0.018 *6*, Ice(L)=0.035 *16*, Ice(M1)=0.0045 *15*. (789γ)(150γ)(θ): A_2=+0.100 *15*, A_4=−0.05 *3* (1975Se18). (789γ)(150γ)(θ): A_2=−0.233 *21*, A_4=−0.023 *30* (1985Be64).
794.7*c*	<0.002	795.030	9/2$^-$	0.0	5/2$^+$				%Iγ<0.000968 γ reported only by 1975Al14 and 1996Vy02. Interpreted by 2006Ri11 as a sum line, an upper limit set. Iγ=0.028 *12* (1996Vy02), 0.056 *19* (1975Al14). E_γ: 794.7 *3* in 1975Al14.
798.91 *2*	0.104 *4*	798.937	(9/2$^+$)	0.0	5/2$^+$				%Iγ=0.0503 *33* Eγ=798.90 *2* (2006Ri11), 798.94 *2* (1990Me15), 798.90 *2* (1987Ad02). Iγ=0.108 *3* (2006Ri11), 0.093 *5* (1990Me15), 0.104 *3* (1987Ad02). Other: 0.090 *5* (1996Vy02). Mult.: (M2) from 1996Vy02 proposed by 1996Vy02 for 798.9γ is inconsistent with positive parity for the 798 level.
802.93 *2*	0.0924 *34*	952.667	(3/2$^+$ to 9/2$^+$)	149.732	7/2$^+$				%Iγ=0.0447 *29* Eγ=802.91 *2* (2006Ri11), 802.93 *2* (1990Me15), 802.95

$^{149}_{63}Eu_{86}$-17

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	α[b]	Comments
									2 (1987Ad02).
									Iγ=0.098 3 (2006Ri11), 0.088 5 (1990Me15), 0.0891 27 (1987Ad02).
812.630 10	0.304 5	812.631	5/2$^+$	0.0	5/2$^+$	M1,E2		0.0055 14	%Iγ=0.147 8 α(K)exp=0.0064 22 α(K)=0.0047 13; α(L)=0.00066 15; α(M)=0.000142 31 α(N)=3.3×10^{-5} 7; α(O)=5.1×10^{-6} 12; α(P)=5.0×10^{-7} 14 Eγ=812.62 2 (2006Ri11), 812.64 3 (1990Me15), 812.632 10 (1987Ad02). Iγ=0.305 7 (2006Ri11), 0.303 5 (1990Me15), 0.305 5 (1987Ad02). Ice(K)=0.0039 13.
842.29[#c] 10	0.011[#] 1	992.203	(3/2$^+$ to 9/2$^+$)	149.732	7/2$^+$				%Iγ=0.0053 6
862.862 12	0.136 2	1012.594	(5/2,7/2,9/2)	149.732	7/2$^+$				%Iγ=0.066 4 α(K)exp=0.018 5 Eγ=862.87 3 (2006Ri11), 862.86 3 (1990Me15), 862.861 12 (1987Ad02). Iγ=0.135 2 (2006Ri11), 0.140 4 (1990Me15), 0.1360 28 (1987Ad02). Mult.: α(K)exp gives M2. But it is inconsistent with ΔJ=0,1 which would favor E1 component over M2. Ice(K)=0.0051 13.
[x]872.62[‡]	<0.005								
875.91 4	0.315 5	875.939	5/2$^+$	0.0	5/2$^+$	M1(+E2)	<0.3	0.00573 13	%Iγ=0.152 8 α(K)exp=0.0058 9 α(K)=0.00489 11; α(L)=0.000661 14; α(M)=0.0001421 29 α(N)=3.25×10^{-5} 7; α(O)=5.18×10^{-6} 11; α(P)=5.25×10^{-7} 12 Eγ=875.95 2 (2006Ri11), 875.83 1 (1990Me15), 875.943 10 (1987Ad02): unweighted average. Iγ=0.320 5 (2006Ri11), 0.313 5 (1990Me15), 0.312 6 (1987Ad02). Ice(K)=0.0036 8.
[x]880.04[‡]	<0.002								
[x]898.99[‡]	<0.001								
933.06 7	1.288 10	933.119	(9/2)$^+$	0.0	5/2$^+$	E2		0.00303 4	%Iγ=0.624 33 α(K)exp=0.0024 8 α(K)=0.00256 4; α(L)=0.000371 5; α(M)=8.02×10^{-5} 11

$^{149}_{63}Eu_{86}$-18

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ[†]	I_γ[@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	α[b]	Comments
									α(N)=1.828×10^{-5} *26*; α(O)=2.86×10^{-6} *4*; α(P)=2.63×10^{-7} *4* Eγ=933.13 *2* (2006Ri11), 932.925 *6* (1990Me15), 933.134 *14* (1987Ad02): unweighted average. Iγ=1.288 *12* (2006Ri11), 1.287 *10* (1990Me15), 1.31 *4* (1987Ad02). δ(E2/M1)>1.4 from α(K)exp, but ΔJ^π requires E2. Ice(K)=0.0062 *20*.
938.616 *10*	5.01 *4*	938.609	7/2$^+$	0.0	5/2$^+$	M1+E2	1.0 *+10−5*	0.0040 *6*	%Iγ=2.43 *13* α(K)exp=0.0034 *5*; α(L1)exp=0.0005 *2*; α(L)exp=0.00046 *6*; α(M1)exp=0.00016 *3* α(M)exp=0.00018 *9* α(N)=2.30×10^{-5} *30*; α(O)=3.6×10^{-6} *5*; α(P)=3.6×10^{-7} *6* α(K)=0.0034 *5*; α(L)=0.00047 *6*; α(M)=0.000100 *13* Eγ=938.63 *3* (2006Ri11), 938.605 *5* (1990Me15), 938.626 *11* (1987Ad02). Iγ=5.03 *4* (2006Ri11), 4.97 *6* (1990Me15), 4.95 *10* (1987Ad02). Ice(K)=0.034 *4*, Ice(L1)=0.005 *2*, Ice(L)=0.0046 *6*, Ice(M1)=0.0016 *3*, Ice(M)=0.0018 *9*.
947.858 *19*	1.98 *3*	1097.591	(9/2)$^-$	149.732	7/2$^+$	E1		1.20×10^{-3} *2*	%Iγ=0.96 *5* α(K)exp=0.00099 *20* α(K)=0.001028 *14*; α(L)=0.0001335 *19*; α(M)=2.85×10^{-5} *4* α(N)=6.51×10^{-6} *9*; α(O)=1.032×10^{-6} *14*; α(P)=1.028×10^{-7} *14* Eγ=947.88 *3* (2006Ri11), 947.820 *6* (1990Me15), 947.873 *10* (1987Ad02): unweighted average. Iγ=1.99 *3* (2006Ri11), 1.973 *34* (1990Me15), 1.99 *4* (1987Ad02). α(K)exp gives δ(M2/E1)<0.15. (948γ)(150γ)(θ): A_2=−0.01 *4*, A_4=+0.03 *7* (1975Se18). (948γ)(150γ)(θ): A_2=+0.063 *19*, A_4=+0.005 *9* (1985Be64).
952.65 *4*	0.0243 *23*	952.667	(3/2$^+$ to 9/2$^+$)	0.0	5/2$^+$				%Iγ=0.0118 *13* Eγ=952.61 *3* (2006Ri11), 952.68 *3* (1987Ad02). Iγ=0.0266 *15* (2006Ri11), 0.0220 *9* (1987Ad02): unweighted average.

$^{149}_{63}Eu_{86}$-19

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[b]	Comments
[x]956.4[‡]	<0.001							Presence of this γ ray in 1992Ca11 (Iγ=0.03 *3* and 1975Se18 (Eγ=956.4 *5*, Iγ=0.55 *30*, and tentative placement from a 956.4 level by 1975Se18 are not supported by 1996Vy02 and 2006Ri11.
992.201 *10*	0.0666 *18*	992.203	(3/2$^+$ to 9/2$^+$)	0.0	5/2$^+$			%Iγ=0.0322 *19* Eγ=992.21 *4* (2006Ri11), 992.205 *4* (1990Me15), 992.192 *15* (1987Ad02). Iγ=0.066 *2* (2006Ri11), 0.0661 *20* (1990Me15), 0.0675 *18* (1987Ad02). Other: 0.064 *4* (1996Vy02).
1012.61 *2*	0.0482 *16*	1012.594	(5/2,7/2,9/2)	0.0	5/2$^+$			%Iγ=0.0233 *15* Eγ=1012.61 *4* (2006Ri11), 1012.59 *5* (1990Me15), 1012.61 *2* (1987Ad02). Iγ=0.0514 *11* (2006Ri11), 0.0465 *15* (1990Me15), 0.0466 *14* (1987Ad02): unweighted average.
1015.30 *3*	0.0253 *10*	1165.04	(5/2,7/2,9/2)	149.732	7/2$^+$			%Iγ=0.0122 *8* Eγ=1015.25 *9* (2006Ri11), 1015.31 *3* (1987Ad02). Iγ=0.0260 *24* (2006Ri11), 0.0252 *10* (1987Ad02). Other: 0.027 *2* (1996Vy02).
1081.58 *3*	0.0371 *14*	1231.253	9/2$^-$	149.732	7/2$^+$			%Iγ=0.0180 *12* α(K)exp=0.021 *14* Eγ=1081.57 *3* (2006Ri11), 1081.58 *6* (1990Me15), 1081.58 *3* (1987Ad02). Iγ=0.0356 *27* (2006Ri11), 0.0362 *15* (1990Me15), 0.0382 *14* (1987Ad02). α(K)exp marginally agrees with M2. Ice(K)=0.0016 *11*.
1096.68 *5*	0.0034 *3*	1246.41	(5/2,7/2,9/2)	149.732	7/2$^+$			%Iγ=0.00165 *17* Eγ=1096.79 *12* (2006Ri11), 1096.70 *5* (1990Me15), 1096.59 *8* (1987Ad02). Iγ=0.005 *3* (2006Ri11), 0.0029 *5* (1990Me15), 0.0035 *3* (1987Ad02).
1097.54[c]	<0.004	1097.591	(9/2)$^-$	0.0	5/2$^+$			%Iγ<0.00194 Eγ=1097.54, Iγ=0.018 *7* in 1996Vy02. 2006Ri11 interpreted this γ ray as a sum line, and set an upper limit of 0.004.
1207.70 *7*	0.0024 *2*	1207.72	(5/2,7/2,9/2)	0.0	5/2$^+$			%Iγ=0.00116 *11* Eγ=1207.58 *12* (2006Ri11), 1207.71 *7* (1990Me15), 1207.81 *12* (1987Ad02). Iγ=0.0030 *3* (2006Ri11), 0.00220 *20* (1990Me15), 0.0024 *2* (1987Ad02).
1220.57 *12*	0.0016 *1*	1220.56	5/2$^+$	0.0	5/2$^+$			%Iγ=0.00077 *6* Eγ=1220.49 *12* (2006Ri11), 1220.64 *12* (1987Ad02). Iγ=0.0020 *3* (2006Ri11), 0.0016 *1* (1987Ad02).
1231.2 *2*	0.00070 *20*	1231.253	9/2$^-$	0.0	5/2$^+$	[M2]	0.00617 *9*	%Iγ=0.00034 *10* α(K)=0.00523 *7*; α(L)=0.000736 *10*; α(M)=0.0001590 *22*

$^{149}_{63}Eu_{86}$-20

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15 (continued)

γ(^{149}Eu) (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						α(N)=3.65×10^{-5} *5*; α(O)=5.80×10^{-6} *8*; α(P)=5.82×10^{-7} *8*; α(IPF)=2.431×10^{-6} *35*
						Eγ=1231.4 *2* (2006Ri11), 1231.02 (1990Me15).
						Iγ=0.0005 *5* (2006Ri11), 0.00073 *20* (1990Me15).
1246.38 *8*	0.0043 *2*	1246.41	(5/2,7/2,9/2)	0.0	5/2$^+$	%Iγ=0.00208 *15*
						Eγ=1246.27 *12* (2006Ri11), 1246.4 *1* (1990Me15), 1246.41 *8* (1987Ad02).
						Iγ=0.0046 *4* (2006Ri11), 0.00445 *34* (1990Me15), 0.0041 *2* (1987Ad02).

† Weighted average of values from the most precise and consistent data from 2006Ri11, 1990Me15 and 1987Ad02, with uncertainty increased to 0.010 keV, when a lower uncertainty is reported in 1990Me15 and/or 1987Ad02. As indicated, unweighted averages are taken in a few cases where there is lack of consistent data. Exceptions are noted. Other (less precise) measurements using Ge(Li) detector: 1975Se18, 1975Al14.

‡ Transition reported by 1996Vy02 not confirmed by 2006Ri11, upper limit of intensity is given.

Reported only by 2006Ri11. Authors suggest a tentative placement as no γγ-coin evidence is available yet for this γ ray.

@ Weighted average of values from the most precise and consistent data from 2006Ri11, 1990Me15 and 1987Ad02, with uncertainty increased to 0.5%, when a lower uncertainty is reported in 1990Me15 and/or 1987Ad02. As indicated, unweighted averages are taken in a few cases where there is lack of consistent data. Exceptions are noted. Other (less precise) measurements using Ge(Li) detector: 1992Ca11, 1975Se18, 1975Al14, 1970Ep01.

& From ce data given under comments, unless otherwise noted. In cases where ce data give M1+E2 or E1+M2 with a significant admixture, the former assignment is preferred, as there is no evidence of long half-lives, as would be expected when there is substantial M2 admixture. Where only ce data are available, the quoted mixing ratio is deduced from those data by the evaluators using the BrIccMixing program.

[a] For absolute intensity per 100 decays, multiply by 0.48 *3*.

[b] 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.

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

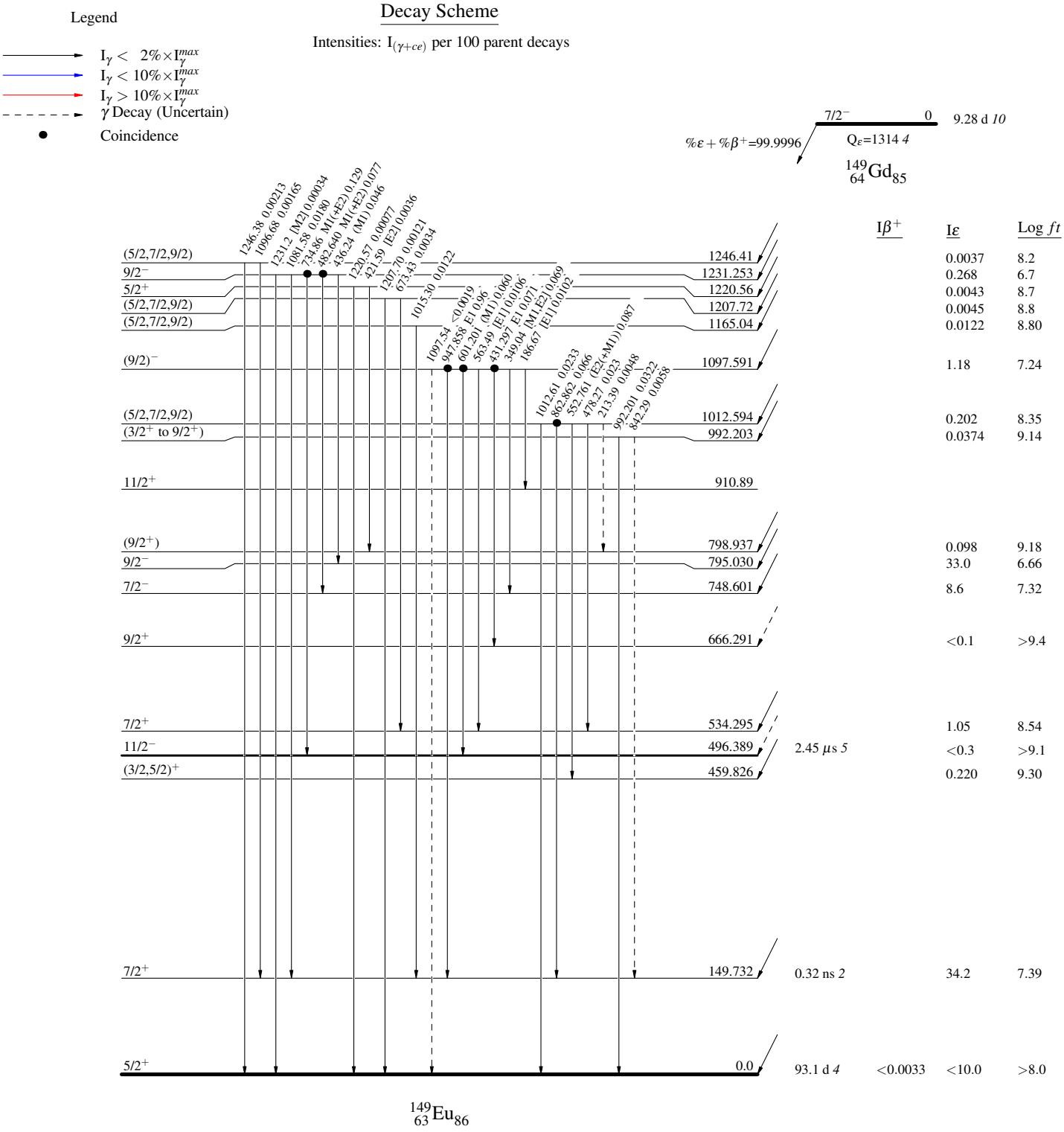
[x] γ ray not placed in level scheme.

$^{149}_{63}Eu_{86}$-21

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



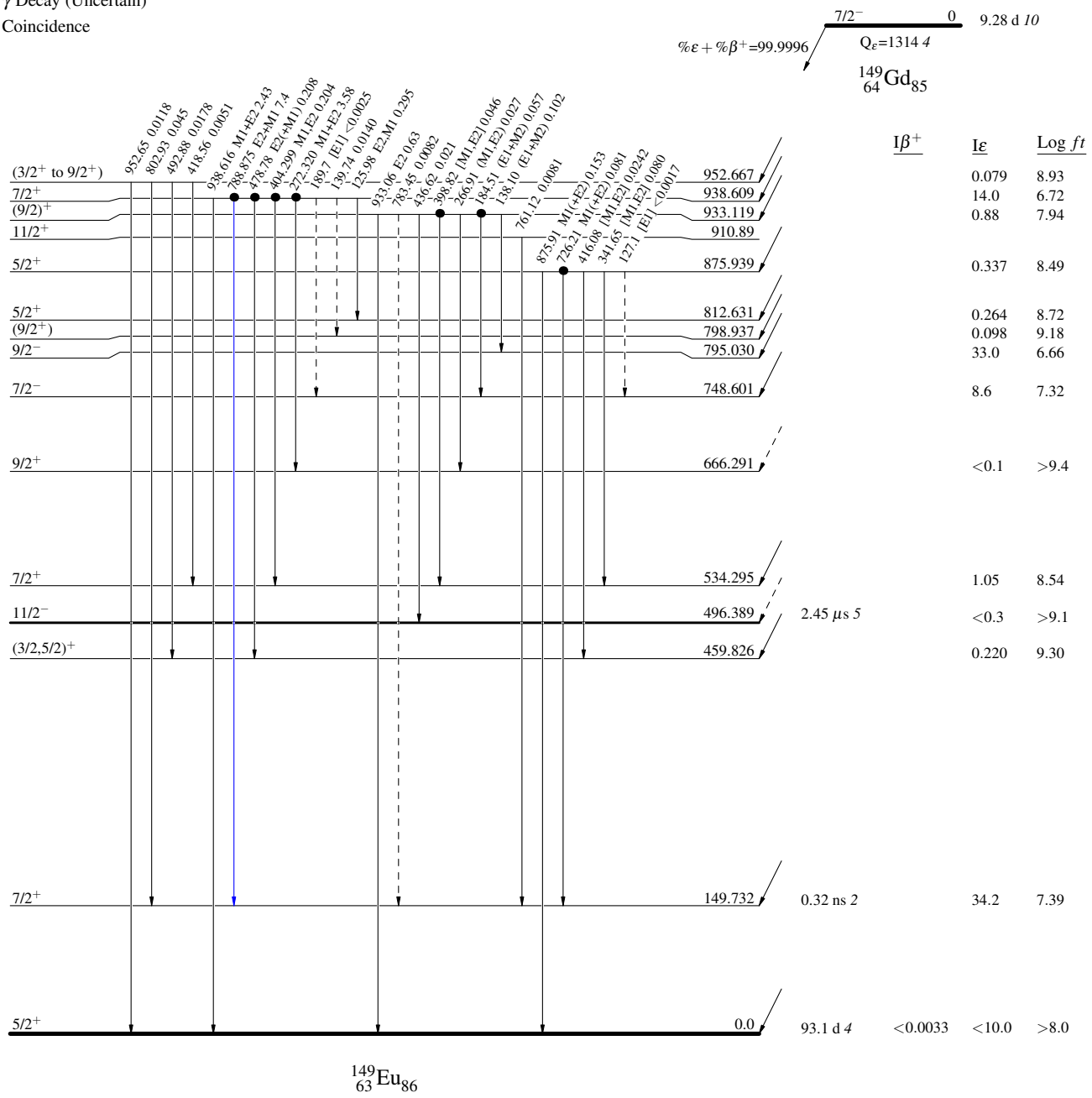
^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



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

^{149}Gd ε decay (9.28 d) 2006Ri11,1987Ad02,1990Me15

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays