^{157}Gd IT decay (18.5 μs) 1967Bo05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 132, 1 (2016)	4-Dec-2015

Parent: ^{157}Gd: E=426.538 *23*; $J^\pi=11/2^-$; $T_{1/2}$=18.5 μs *23*; %IT decay=100.0
Data are all from 1967Bo05, except as noted otherwise. Isomer was produced by ^{154}Sm(α,n) reaction on enriched target.
γ singles and γγ coincidences measured between α beam pulses with NaI and Ge detectors.

^{157}Gd Levels

Additional information 1.

E(level)	J^π[†]	$T_{1/2}$	Comments
0.0[‡]	$3/2^-$	stable	
55[‡]	$5/2^-$		
64[#]	$5/2^+$	0.59 μs *12*	$T_{1/2}$: from 1967Bo05.
115[#]	$7/2^+$		
131[‡]	$7/2^-$		
180[#]	$9/2^+$		
226[‡]	$9/2^-$		
425[@]	$11/2^-$	18.5 μs *23*	$T_{1/2}$: Weighted average of 17 μs *1* (1967Bo05) and 22.0 μs *15* (1961Kr01). These two values are inconsistent since the reduced-χ^2=7.7 for this average.

[†] From the measured γ multipolarities, the expected band structure, and the systematics of the Nilsson levels, especially for the $11/2^-$ isomeric state. All assignments agree with those of the ^{157}Gd Adopted Levels.
[‡] Band(A): 3/2[521] band.
[#] Band(B): 5/2[642] band.
[@] Band(C): 11/2[505] bandhead.

γ(^{157}Gd)

Iγ normalization: calculated to give 100% decays from the isomer.

E_γ	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#&]	α[@]	$I_{(\gamma+ce)}$[a]	Comments
(9 *2*)	1.8 *9*	64	$5/2^+$	55	$5/2^-$	E1		33 *17*		α(M)=7 *7* α(N)=1.4 *14*; α(O)=0.15 *12*; α(P)=0.0030 *18* I_γ: From ^{157}Eu β- decay (1980GrZS) one obtains /I_γ(64)= 2.0/28 which gives I_γ(9)=2.0; and from IT decay (1967Bo05) I(γ+ce)(9)/I(γ+ce)(64)=48/52, which gives I_γ(9)=1.6. Average value of 2.0 and 1.6 is used and uncertainty is assigned by evaluator.
51		115	$7/2^+$	64	$5/2^+$	M1+E2	0.20	14.61	95	α(K)=11.31 *7*; α(L)=2.62 *18*; α(M)=0.59 *5*; α(N+..)=0.167 *12* I_γ: From transition intensity and α, I_γ=6.1. $I_{(\gamma+ce)}$: From intensity balance at 115 level.

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^{157}Gd IT decay (18.5 μs) 1967Bo05 (continued)

γ(^{157}Gd) (continued)

E_γ	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#&]	α[@]	$I_{(\gamma+ce)}$[a]	Comments
55		55	5/2⁻	0.0	3/2⁻	M1+E2	0.19	11.80	103	ce(K)/(γ+ce)=0.726 *7*; ce(L)/(γ+ce)=0.153 *3*; ce(M)/(γ+ce)=0.0342 *7* ce(N)/(γ+ce)=0.00778 *15*; ce(O)/(γ+ce)=0.001138 *22*; ce(P)/(γ+ce)=5.48×10^{-5} *11* α(K)=9.29 *13*; α(L)=1.96 *3*; α(M)=0.438 *7* α(N)=0.0995 *14*; α(O)=0.01457 *21*; α(P)=0.000701 *10* I_γ: From transition intensity and α, I_γ=8.0. $I_{(\gamma+ce)}$: Value deduced by evaluator to give 100% feeding of ground state.
64	28 *4*	64	5/2⁺	0.0	3/2⁻	E1		0.958		α(K)=0.793 *12*; α(L)=0.1297 *19*; α(M)=0.0282 *4* α(N)=0.00632 *9*; α(O)=0.000902 *13*; α(P)=4.17×10^{-5} *6* I_γ: From measured total I_γ(64)+I_γ(65)=42 (1967Bo05) minus I_γ(65)=11 deduced from intensity balance at 180 level, one obtains I_γ=31, but intensity balance at 64 level supports lower value of 1967Bo05. Uncertainty assigned by evaluator and depends, in part, on the lack of knowledge as to the mixing ratio of the 65 γ.
65	11 *3*	180	9/2⁺	115	7/2⁺	M1+E2		10 *3*	95	ce(K)/(γ+ce)=0.40 *13*; ce(L)/(γ+ce)=0.39 *22*; ce(M)/(γ+ce)=0.09 *8* ce(N)/(γ+ce)=0.021 *18*; ce(O)/(γ+ce)=0.0027 *23*; ce(P)/(γ+ce)=2.7×10^{-5} *15* α(K)=4.4 *15*; α(L)=4 *4*; α(M)=1.0 *9* α(N)=0.23 *19*; α(O)=0.030 *24*; α(P)=0.00030 *15* I_γ: Value is average of I_γ=14 given by 1967Bo05 based on intensity balance at 180 level and assumption that γ is M1 and the I_γ=8 deduced if γ is E2. $I_{(\gamma+ce)}$: Value deduced by evaluator from intensity balance at 180 level; since 116 γ is weak and must be E2, value is reliable.
76	12 *2*	131	7/2⁻	55	5/2⁻	M1+E2	0.18	4.52		α(K)=3.70 *6*; α(L)=0.643 *9*; α(M)=0.1421 *20* α(N)=0.0325 *5*; α(O)=0.00488 *7*; α(P)=0.000275 *4*
95	15 *2*	226	9/2⁻	131	7/2⁻	[M1+E2]		2.7 *4*		α(K)=1.6 *4*; α(L)=0.8 *6*; α(M)=0.19 *13* α(N)=0.04 *3*; α(O)=0.006 *4*; α(P)=0.00011 *4*
116	2 *1*	180	9/2⁺	64	5/2⁺	[E2]		1.467		α(K)=0.775 *11*; α(L)=0.534 *8*; α(M)=0.1255 *18* α(N)=0.0280 *4*; α(O)=0.00371 *6*; α(P)=3.93×10^{-5} *6* I_γ: I_γ(116)/I_γ(65)=0.14 (1967Bo05).

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^{157}Gd IT decay (18.5 μs) 1967Bo05 (continued)

γ(^{157}Gd) (continued)

E_γ	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[@]	Comments
131	1.0 *5*	131	7/2$^-$	0.0	3/2$^-$	E2	0.951	α(K)=0.548 *8*; α(L)=0.312 *5*; α(M)=0.0730 *11* α(N)=0.01633 *23*; α(O)=0.00217 *3*; α(P)=2.85×10^{-5} *4*
171	11 *2*	226	9/2$^-$	55	5/2$^-$	[E2]	0.377	α(K)=0.248 *4*; α(L)=0.0995 *14*; α(M)=0.0231 *4* α(N)=0.00518 *8*; α(O)=0.000702 *10*; α(P)=1.375×10^{-5} *20*
199	48 *2*	425	11/2$^-$	226	9/2$^-$	[M1+E2]	0.26 *4*	α(K)=0.20 *5*; α(L)=0.044 *10*; α(M)=0.0100 *24* α(N)=0.0023 *5*; α(O)=0.00033 *6*; α(P)=1.4×10^{-5} *5*
245	97 *5*	425	11/2$^-$	180	9/2$^+$	[E1]	0.0267	α(K)=0.0227 *4*; α(L)=0.00317 *5*; α(M)=0.000685 *10* α(N)=0.0001563 *22*; α(O)=2.36×10^{-5} *4*; α(P)=1.416×10^{-6} *20*

† Uncertainties are not given directly in 1967Bo05, but deduced by evaluator from uncertainties given (1967Bo05) in transition intensities.
‡ I(K x ray)=273 *60*.
# From ^{157}Gd Adopted γ data.
@ Additional information 2.
& If no value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
a For absolute intensity per 100 decays, multiply by 0.625 *23*.

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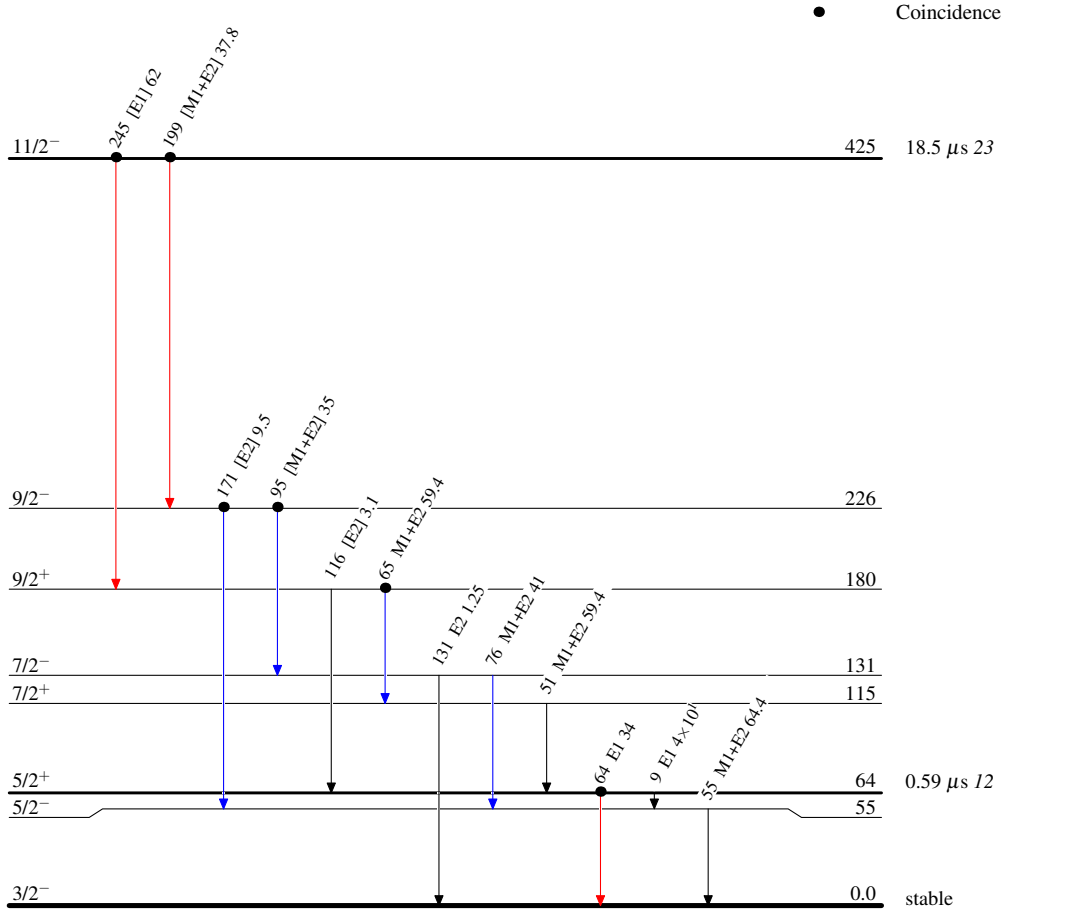
Decay Scheme

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

%IT=100.0



$^{157}_{64}Gd_{93}$

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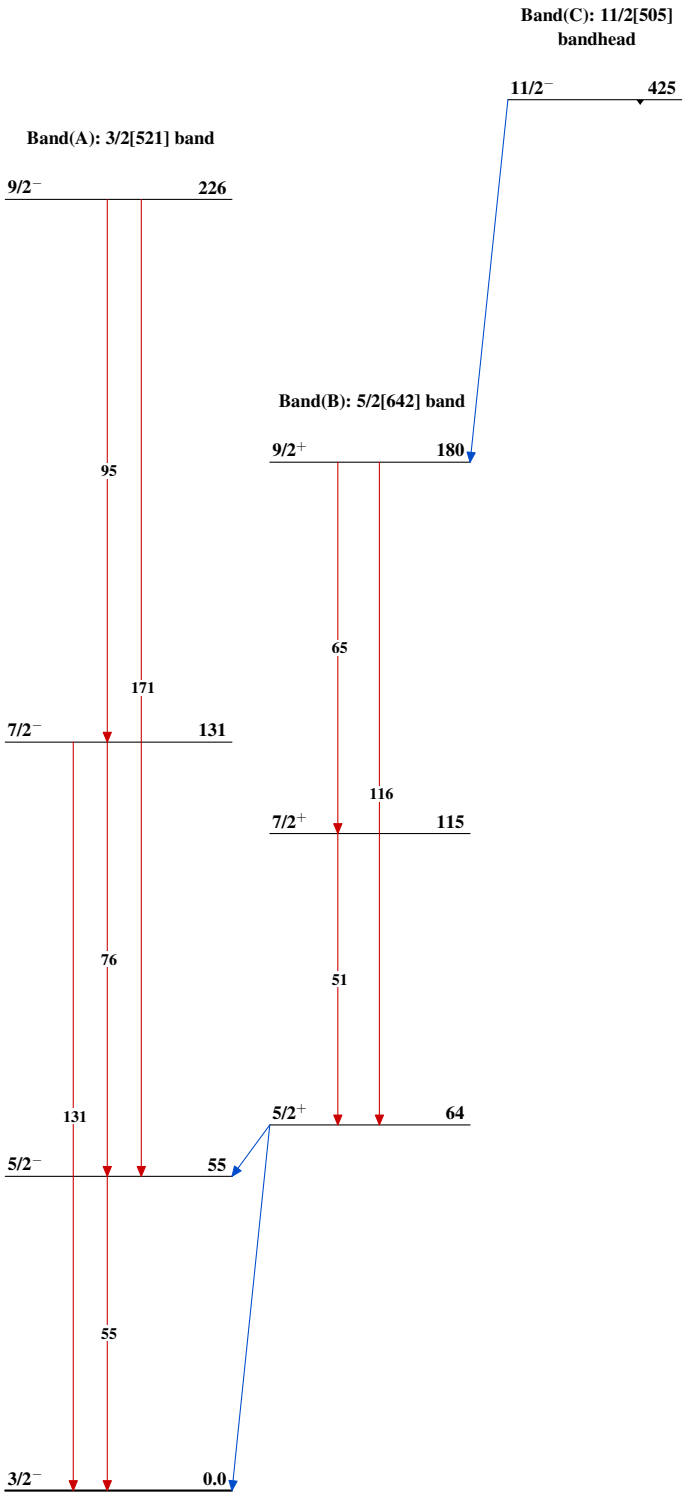

$^{157}_{64}Gd_{93}$