^{139}Sm IT decay (10.7 s) 1986De35,1975Va14,1973VaYZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138,1 (2016)	15-Oct-2016

Parent: ^{139}Sm: E=457.40 *22*; $J^\pi=11/2^-$; $T_{1/2}$=10.7 s *6*; %IT decay=93.7 *5*

^{139}Sm-%IT decay: from Iγ(190.1γ+188.7γ (^{139}Pm))=100 and Iγ(188.7γ)/Iγ(190.1γ)=0.068 *5* (1975Va14).

1986De35: ^{139}Eu produced in ^{144}Sm(p,6n),E=50-90 MeV. Identification by means of $T_{1/2}\approx$22 s, production threshold energy, and constancy of Iγ as a function of bombarding energies. Measured Eγ, Iγ and x rays, $\gamma\gamma$, isomer half-life, ce. The isomer half-life measured over a period of ≈200 s; two groups, one with $T_{1/2}$ of 17.9 s *6* and one with a feeding $T_{1/2}$ of 17.9 s *6* and α decay $T_{1/2}$ of 10.7 s *6*.

1975Va14 (also 1973VaYZ, 1971Va22): measured γ and ce spectra.

All data are from 1986De35, except as noted. Decay scheme based on γ-ray singles, $\gamma\gamma$-coin, energy sums, and conversion electron coefficients and differs from that of 1973VaYZ and 1975Va14 in the order of the 112γ and completeness.

^{139}Sm Levels

E(level)	J^π†	$T_{1/2}$†	Comments
0.0	$1/2^+$	2.57 min *10*	%ε+%β^+=100 $T_{1/2}$ and decay modes from Adopted Levels.
111.93 *15*	$3/2^+$		
223.49 *13*	$(3/2)^+$		
267.28 *13*	$5/2^+$		
457.40 *22*	$11/2^-$	10.7 s *6*	%ε+%β^+=6.3 *5*; %IT=93.7 *5* $T_{1/2}$: other: 9.5 s *10* (1973VaYZ).

† From the Adopted Levels.

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γ(^{139}Sm)

Iγ normalization: from Iγ(190.1γ)(1+α)=100 (evaluators).
α(K)exp: from concurrent measurement of ce(K) and γ.
K/L are from 1973VaYZ, except for K/L(190.1γ).

E_γ	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[c]	$I_{(\gamma+ce)}$[b]	Comments
43.8[‡] *1*	≈0.17	267.28	5/2$^+$	223.49	(3/2)$^+$	E2		57.7 *11*	5.0 *7*	ce(L)/(γ+ce)=0.762 *9*; ce(M)/(γ+ce)=0.178 *4*; ce(N)/(γ+ce)=0.0387 *10*; ce(O)/(γ+ce)=0.00473 *12*; ce(P)/(γ+ce)=4.96×10^{-6} *12* ce(N+)/(γ+ce)=0.0434 *11* I_γ: estimated from spectrum of low-energy γ′s and K x ray′s in coin with 190.1γ and calculated Iγ(K x ray)′s (evaluators). Mult.: M1,E2 from decay scheme. E2 from I(γ+ce) and estimated Iγ (evaluators). $I_{(\gamma+ce)}$: from 223.5γ-190.1γ coin, corrected for α. Uncertainty estimated by evaluators.
111.6 *2*	2.2 *5*	223.49	(3/2)$^+$	111.93	3/2$^+$	[M1,E2]		1.41 *18*		α(K)=0.96 *9*; α(L)=0.35 *20*; α(M)=0.08 *5*; α(N)=0.017 *11*; α(O)=0.0023 *13*; α(P)=5.2×10^{-5} *15*
111.9 *2*	68 *7*	111.93	3/2$^+$	0.0	1/2$^+$	M1(+E2)[#]	<0.50[@]	1.26 *4*		α(K)exp=1.02 *11*; K/L=7.5 *30* α(K)=1.022 *23*; α(L)=0.19 *4*; α(M)=0.041 *10*; α(N)=0.0092 *21*; α(O)=0.00131 *24* α(P)=6.3×10^{-5} *3*
155.3 *2*	100	267.28	5/2$^+$	111.93	3/2$^+$	M1[#]	[@]	0.486		α(K)exp=0.42 *6*; K/L=5.0 *25* α(K)=0.412 *6*; α(L)=0.0581 *9*; α(M)=0.01247 *18*; α(N)=0.00283 *4*; α(O)=0.000424 *7* α(P)=2.63×10^{-5} *4* δ(E2/M1)<1.7 from α(K)exp, but stretched dipole in in-beam γ-ray suggests dominant dipole.
190.1 *2*	102 *10*	457.40	11/2$^-$	267.28	5/2$^+$	E3[#]		1.516	100	α(K)exp=0.64 *5*; K/L=0.97 *8* (1986De35); K/L=1.03 *6* (1975Va14) α(K)=0.650 *10*; α(L)=0.668 *10*; α(M)=0.1588 *24*; α(N)=0.0350 *6*; α(O)=0.00442 *7* α(P)=3.30×10^{-5} *5* ce(K)/(γ+ce)=0.259 *4*; ce(L)/(γ+ce)=0.265 *4*; ce(M)/(γ+ce)=0.0631 *11*; ce(N)/(γ+ce)=0.01390 *25* ce(O)/(γ+ce)=0.00176 *3*; ce(P)/(γ+ce)=1.312×10^{-5} *23*; ce(N+)/(γ+ce)=0.0157 *3*
223.5 *2*	8.6 *9*	223.49	(3/2)$^+$	0.0	1/2$^+$	(M1+E2)[&]	[&]	0.161 *18*		α(K)exp=0.13 *6* α(K)=0.129 *23*; α(L)=0.025 *5*; α(M)=0.0056 *11*;

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γ(^{139}Sm) (continued)

E_γ	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[c]	Comments
								α(N)=0.00125 *22*; α(O)=0.000176 *22* α(P)=7.5×10^{-6} *21*
267.3 *2*	100 *10*	267.28	5/2$^+$	0.0	1/2$^+$	E2	0.0808	α(K)exp=0.066 *7* α(K)=0.0618 *9*; α(L)=0.01483 *22*; α(M)=0.00332 *5*; α(N)=0.000738 *11*; α(O)=0.0001005 *15* α(P)=3.25×10^{-6} *5*

† From Adopted Gammas, based mostly on data in the present decay.
‡ Seen only in coincidence spectra.
# From α(K)exp and K/L.
@ From K/L.
& From α(K)exp and decay scheme.
[a] For absolute intensity per 100 decays, multiply by 0.37 *4*.
[b] For absolute intensity per 100 decays, multiply by 0.937 *5*.
[c] 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.

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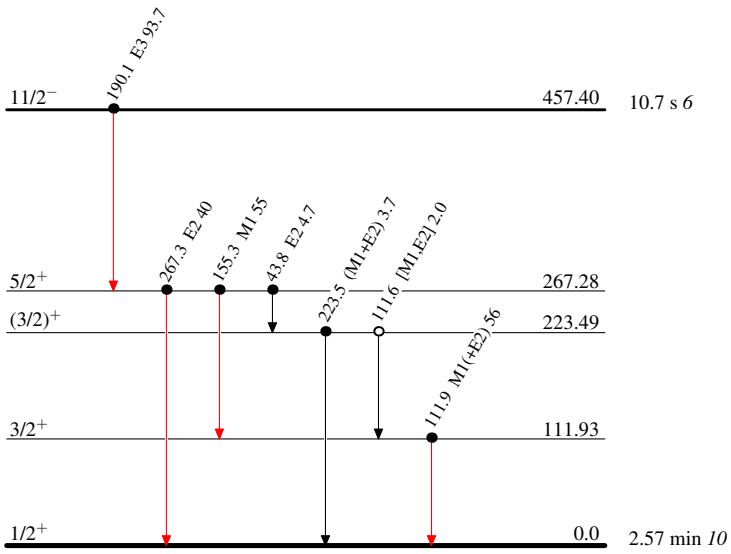
Legend

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

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
%IT=93.7 *5*



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