^{159}Sm IT decay (115 ns)   **2017Pa25,2009Ur04**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	07-June-2023

Parent: ^{159}Sm: E=1275.9 *14*; J$^\pi$=(11/2$^-$); T$_{1/2}$=115 ns *10*; %IT decay=100

2017Pa25: ^{159}Sm nuclide produced at the RIBF-RIKEN facility in ^{9}Be(^{238}U,F),E(^{238}U)=345 MeV/nucleon, followed by the identification of the nuclide of interest using the BigRIPS separator by determining the A/Q ratio of the ion using the tof-Bρ-ΔE method. The reaction products were transported through the ZeroDegree Spectrometer and implanted into the beta-counting system WAS3ABi, surrounded by the EURICA array with 84 HPGe detectors. Measured Eγ, Iγ, (implanted ions)$\gamma\gamma$(t) correlations within a 100 μs time window following implantation. Comparison with Nilsson+BCS calculations.

2009Ur04: γ radiation studied using the Gammasphere array, with ^{252}Cf spontaneous-fission source. Measured Eγ, Iγ, triple and higher-fold $\gamma\gamma$-coin using the Gammasphere array of anti-Compton HPGe detectors at Argonne National Laboratory. Comparison with quasiparticle rotor model calculations. Comparison with quasiparticle rotor model calculations.

^{159}Sm Levels

E(level)†	J$^{\pi\ddagger}$	T$_{1/2}$	Comments
0.0$^\#$	5/2$^-$		
163.1$^\#$ *9*	(9/2$^-$)		
406.3$^\#$ *12*	(13/2$^-$)		
1275.9 *14*	(11/2$^-$)	115 ns *10*	%IT=100 J$^\pi$: from the Adopted Levels, based on ν11/2[505] assignment by 2009Ur04. 2017Pa25 assiged (15/2$^+$) and proposed a 3-qp state configuration=ν(5/2[523])⊗π5/2[532]⊗π5/2[413]. T$_{1/2}$: from the Adopted Levels, from measurement by 2009Ur04 with a higher statistics than in 2017Pa25. 2017Pa25 measured T$_{1/2}$=50 ns *17* from a weighted average of values from 163γ(t) and 243γ(t).

† From Eγ data.
‡ From the Adopted Levels.
$^\#$ Band(A): ν5/2[523] band.

γ(^{159}Sm)

E$_\gamma$†	I$_\gamma$†‡	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	$\alpha^\#$
163.1 *9*	25 *10*	163.1	(9/2$^-$)	0.0	5/2$^-$	[E2]	0.417 *10*
243.2 *7*	67 *21*	406.3	(13/2$^-$)	163.1	(9/2$^-$)	[E2]	0.1095 *19*
869.6 *8*	100 *31*	1275.9	(11/2$^-$)	406.3	(13/2$^-$)		

† From 2017Pa25.
‡ Absolute intensity per 100 decays.
$^\#$ 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.
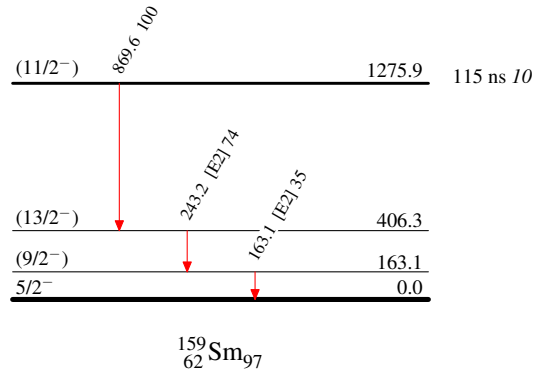
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Decay Scheme

Intensities: I$_{(\gamma+ce)}$ per 100 parent decays
%IT=100

Legend

$I_\gamma < \; 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

(11/2$^-$)   869.6 100   1275.9   115 ns *10*

243.2 [E2] 74   163.1 [E2] 35

(13/2$^-$)   406.3

(9/2$^-$)   163.1

5/2$^-$ 0.0

$^{159}_{62}$Sm$_{97}$

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Band(A): ν5/2[523] band

(13/2$^-$)   406.3

243

(9/2$^-$)   163.1

163

5/2$^-$ 0.0

$^{159}_{62}$Sm$_{97}$