^{162}Sm IT decay (1.78 μs) 2017Pa25,2017Yo01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

Parent: ^{162}Sm: E=1010.7 *6*; J^π=(4$^-$); $T_{1/2}$=1.78 μs *7*; %IT decay=100

^{162}Sm-%IT decay: %IT=100 is assumed by the evaluator.

2017Pa25 compiled for XUNDL database by F.G. Kondev (ANL).

2017Yo01 compiled for XUNDL database by B. Singh (McMaster).

2017Pa25: ^{162}Sm produced at RIBF-RIKEN facility using the ^{9}Be(^{238}U,F) reaction at E=345 MeV/nucleon with an average beam intensity of 10 pnA. The identification of the nuclide of interest was made in the BigRIPS separator by determining the atomic number and the mass-to-charge 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 that was surrounded by the EURICA array comprising of 84 HPGe detectors. Measured implanted ions-γ-γ-t correlations within a 100 μs time window following implantation.

2017Yo01: from ^{9}Be(^{238}U,F), E=345 MeV/nucleon reaction at RIBF-RIKEN facility. ^{162}Sm formed by in-flight fission of 345 MeV/nucleon ^{238}U beam with a 3.96 to 4.93 mm thick ^{9}Be target. Fission fragments separated and identified in the BigRIPS spectrometer by measurement of energy loss ΔE, time-of-flight and magnetic rigidity. Two parallel-plate avalanche counters (PPACs) used to track the position of implanted ions. γ rays detected by four Clover HPGe detectors. Measured Eγ, Iγ, (^{162}Sm ions)γ-coin, delayed γ-radiation, and half-life of isomer, within time window of ≈100 ns to 30 μs. Comparison with theoretical calculations using deformed Hartree-Fock model with angular momentum projection.

2017Pa25 and 2017Yo01 report similar results.

^{162}Sm Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[#]	0$^+$		
71.4[#] *4*	(2$^+$)		
235.9[#] *5*	(4$^+$)		
1010.7[@] *6*	(4$^-$)	1.78 μs *7*	Proposed configuration=*ν*7/2[633]⊗*ν*1/2[521], K^π=4$^-$ from comparison with deformed Hartree-Fock with angular momentum projection model, and projection shell model (2017Yo01; same configuration proposed by 2017Pa25). $T_{1/2}$: From 2017Yo01 from likelihood fitting of time spectrum between the ^{162}Sm beam implantation and subsequent summed 71γ+165γ+775γ-ray spectrum. Other value: 1.7 μs *2* from 2017Pa25, weighted average from 165γ(t) and 775γ(t).

[†] From E_γ's (2017Pa25).

[‡] As assigned by 2017Yo01, based on systematic trend of even-even nuclei for the 2$^+$ and 4$^+$ states, and Hartree-Fock calculations for 4$^-$ state. Same values assigned by 2017Pa25.

[#] Band(A): K^π=0$^+$, g.s. band.

[@] Band(B): K^π=(4$^-$), 2-qp state (2017Pa25).

γ(^{162}Sm)

Iγ normalization: From I(γ+ce)(774.1γ)=100.

E_γ[†]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[@]	Comments
71.4 *4*	9.8 *16*	71.4	(2$^+$)	0.0	0$^+$	[E2]	8.21 *21*	α(K)=2.71 *5*; α(L)=4.26 *13*; α(M)=0.992 *30* α(N)=0.217 *7*; α(O)=0.0269 *8*; α(P)=0.0001145 *22* E_γ: 71.0. I_γ: 6 *2*.
164.5 *3*	62 *3*	235.9	(4$^+$)	71.4	(2$^+$)	[E2]	0.405 *6*	α(K)=0.274 *4*; α(L)=0.1016 *16*; α(M)=0.0232 *4*

Continued on next page (footnotes at end of table)

^{162}Sm IT decay (1.78 μs) 2017Pa25,2017Yo01 (continued)

γ(^{162}Sm) (continued)

E_γ[†]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[@]	Comments
								α(N)=0.00511 *8*; α(O)=0.000668 *11*; α(P)=1.299×10^{-5} *19* E_γ: 164.3. I_γ: 68 *3*.
774.8 *3*	100 *7*	1010.7	(4$^-$)	235.9	(4$^+$)	[E1]	1.69×10^{-3} *2*	α(K)=0.001453 *20*; α(L)=0.0001888 *26*; α(M)=4.01×10^{-5} *6* α(N)=9.07×10^{-6} *13*; α(O)=1.355×10^{-6} *19*; α(P)=8.37×10^{-8} *12* Reduced E1 hindrance factor f_ν=1.53×10^3 *2*, where $\nu=\Delta K-\lambda$. E_γ: 774.1. I_γ: 100 *5*.

[†] From 2017Pa25. Values from 2017Yo01 reported with no unc are given in comments.

[‡] From 2017Yo01 that give relatively well balanced $I_{(\gamma+ce)}$ at each level. As stated by authors the $I_{(\gamma+ce)}$ value from 2017Pa25 through the 2$^+$ level of the ground-state band does not balance, presumably due to the large uncertainty in the efficiency of the array in this energy region. Relative intensity values from 2017Pa25 are given in comments.

[#] As assigned by 2017Yo01, based on assigned J^π values, and also from transition intensity balances for the lowest energy transitions. Same values can be adopted based on the J^π values from 2017Pa25 as well.

[@] Additional information 2.

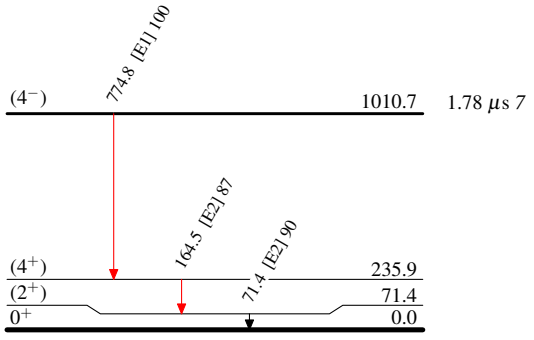
[&] For absolute intensity per 100 decays, multiply by 1.00 *7*.

^{162}Sm IT decay (1.78 μs) 2017Pa25,2017Yo01

Decay Scheme

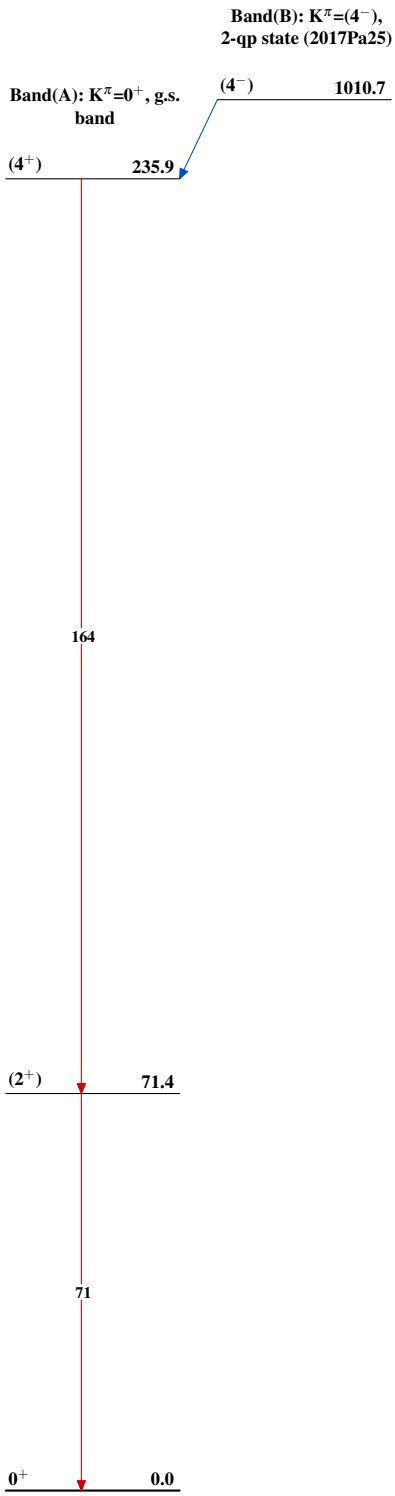
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
%IT=100

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



$^{162}_{62}Sm_{100}$

^{162}Sm IT decay (1.78 μs) 2017Pa25,2017Yo01



$^{162}_{62}Sm_{100}$