

^{252}Cf SF decay 2009Si21,1997Do20,1995Zh15

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

Parent: ^{252}Cf : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=2.645$ y 8; %SF decay=?

^{252}Cf - $T_{1/2}$: from ENSDF Database Adopted Levels, Gammas for ^{252}Cf .

[Additional information 1.](#)

[2009Si21](#): ^{252}Cf SF decay, ^{160}Sm measured E_γ , I_γ , $\gamma\gamma$ -coin, half-lives using the GAMMASPHERE array of Anti-Compton Spectrometers at the Argonne National Laboratory. Deduced levels, J , π , isomers, bands and configurations. Comparison with QPRM calculations.

[1997Do20](#): ^{160}Sm levels studied from the ^{252}Cf SF decay. Deexciting γ 's measured using 72 large-volume Compton-suppressed Ge detectors and two x-ray detectors in the Gammasphere array. $X\gamma$ coincidences also measured using two high-resolution x-ray and two large-volume Compton-suppressed Ge detectors in a close geometry. Measured E_γ , $X\gamma\gamma$, $\gamma\gamma$ and XX coincidences. Report yrast (g.s. band) levels up through $J^\pi=14^+$.

[1995Zh15](#) (involving many of the same authors as [1997Do20](#)): report ^{160}Sm levels excited in the ^{252}Cf SF decay. Measured $\gamma\gamma$ and $\gamma\gamma\gamma$ coin using an array of 20 Compton-suppressed Ge detectors. $\gamma\gamma\gamma$ coin measured using 36 Ge detectors in an early implementation of Gammasphere. $X\gamma$ and XX coin also measured using two x-ray detectors (FWHM=280 eV at 14 keV) and three Ge detectors. Report E_γ , I_γ and members of the g.s. (yrast) band up through the 14^+ level.

[2020Ur03](#): same group as [2009Si21](#) remeasured four E_γ values more precisely.

The data from [1997Do20](#) and [1995Zh15](#) are essentially the same, the only differences being the E_γ values (and, thus, the level energies). [2009Si21](#) retrieve the g.s. rotational band's transitions and levels and discover the 120 ns, (5^-) isomer.

Unless mentioned otherwise data are from [2009Si21](#).

 ^{160}Sm Levels

$E(\text{level})^\dagger$	J^π^\ddagger	$T_{1/2}$	Comments
0 [#]	0 ⁺		
70.8 [#] 2	2 ⁺		
233.1 [#] 3	4 ⁺		
483.4 [#] 4	6 ⁺		
816.9 [#] 4	8 ⁺		
1227.8 [#] 5	(10 ⁺)		
1361.3 4	(5 ⁻)	120 ns 46	$T_{1/2}$: from 2009Si21 (by observing the intensity ratio of 1128 γ /162 γ and 878 γ /250 γ). Dominant configuration= $\nu 5/2^+[642]\otimes\nu 5/2^-[523]$ (2009Si21); for adopted configuration see Adopted Levels.
1710.0 [#] 5	(12 ⁺)		
2258.9 [#] 6	(14 ⁺)		

[†] From least-squares fit to the E_γ 's.

[‡] For positive parity g.s. band values are assigned by [1995Zh15](#) and confirmed by [2009Si21](#) based on considerations of rotational-band structure and the deexcitation characteristics of the highly excited, high-spin, states produced in the spontaneous-fission process. For isomeric state (5⁻) is adopted by [2009Si21](#) based theoretical arguments and systematics.

[#] Band(A): g.s. rotational band.

^{252}Cf SF decay [2009Si21](#),[1997Do20](#),[1995Zh15](#) (continued) $\gamma(^{160}\text{Sm})$

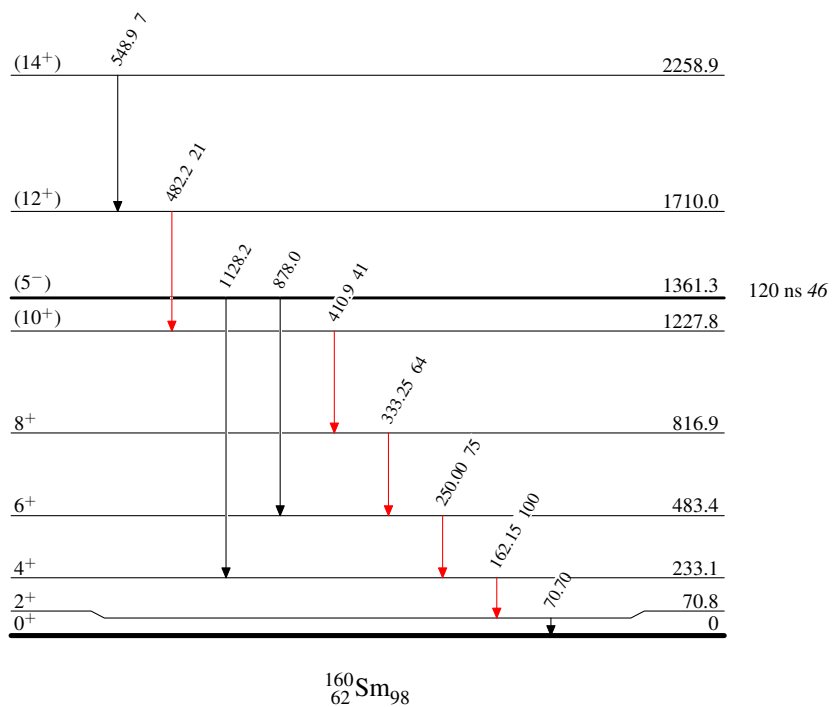
<u>E_γ</u> [†]	<u>I_γ</u> [#]	<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>
70.70 [‡] 5		70.8	2 ⁺	0	0 ⁺
162.15 [‡] 5	100	233.1	4 ⁺	70.8	2 ⁺
250.00 [‡] 5	75	483.4	6 ⁺	233.1	4 ⁺
333.25 [‡] 5	64	816.9	8 ⁺	483.4	6 ⁺
410.9 2	41	1227.8	(10 ⁺)	816.9	8 ⁺
482.2 2	21	1710.0	(12 ⁺)	1227.8	(10 ⁺)
548.9 2	7	2258.9	(14 ⁺)	1710.0	(12 ⁺)
878.0 2		1361.3	(5 ⁻)	483.4	6 ⁺
1128.2 2		1361.3	(5 ⁻)	233.1	4 ⁺

[†] From [2009Si21](#) unless mentioned otherwise.[‡] From [2020Ur03](#).[#] From [1995Zh15](#). [1997Do20](#) and [2009Si21](#) do not report I_γ values.

^{252}Cf SF decay 2009Si21,1997Do20,1995Zh15**Level Scheme**Intensities: Relative I_γ

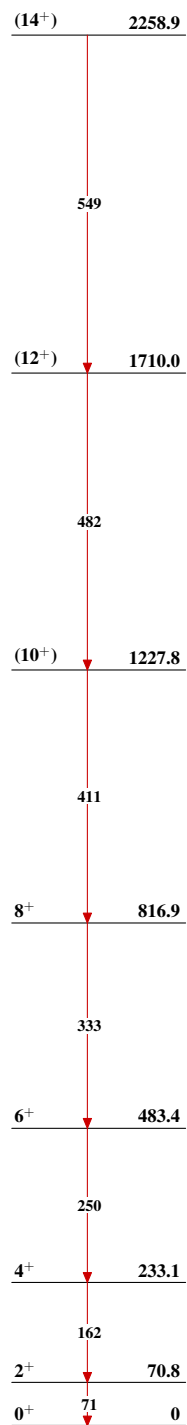
Legend

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



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Band(A): g.s. rotational
band



$^{160}_{62}\text{Sm}_{98}$