

^{248}Cm SF decay **2012Ma13**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Parent: ^{248}Cm : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=3.48\times 10^5$ y 6; %SF decay=?

Data set based on the XUNDL compilation of **2012Ma13** done by B. Singh (McMaster).

Includes ^{252}Cf SF decay data from **2012Ma13**, which differs from ^{252}Cf SF decay dataset based on **2015Wa28**.

There are two experiments performed and analyzed by **2012Ma13**:

1. EUROGAM-II measurement. Measured E_γ , I_γ , $\gamma\gamma$, $\gamma\gamma(\theta)$ from ^{248}Cm fission source. Four LEPS detectors were also used for x rays and low-energy γ rays. In $\gamma\gamma$ coin, double gates were set on complementary nuclide ^{93}Rb .
2. Gammasphere measurement: measured E_γ , I_γ , $\gamma\gamma\gamma$ coin using ^{252}Cf fission source; deduced mass assignment.

Comparison with quasi-particle rotor model calculations.

2012Ma13 point out that the cascades assigned to ^{153}Pr in **2010Hw03** belong instead to ^{154}Pr (and those assigned to ^{151}Pr belong to ^{154}Pr , respectively).

However later **2015Wa28** (same group as **2010Hw03**) performed a new set of experiments (given in the ^{252}Cf SF decay dataset of this evaluation) in which **2015Wa28** do not confirm the assignments of **2012Ma13** but basically reaffirm the initial assignments of the above mentioned cascades to ^{153}Pr (and to ^{151}Pr , respectively).

For a more detailed discussion of **2015Wa28** (and **2010Hw03**) versus **2012Ma13** data, see ^{252}Cf SF decay dataset (of ^{153}Pr in this evaluation).

Based on the fact that the last published study of **2015Wa28** discuss extensively the differences between **2012Ma13** and **2010Hw03**, the assignments of **2015Wa28** were adopted in the Adopted Levels, Gammas dataset. However these assignments are still rather tentative and new studies are needed to elucidate the differences between the three mentioned references.

 ^{153}Pr Levels

$E(\text{level})^\dagger$	J^π^\ddagger	Comments
$0.0+x^\#$	$(7/2^-)$	$E(\text{level})$: $x=20$ (from ^{248}Cm) and $x=37$ (from ^{252}Cf), from particle-rotor model calculations for $3/2[541]$ band.
$141.6+x^\#$ 2	$(11/2^-)$	
$362.6+x^\#$ 3	$(15/2^-)$	
$654.4+x^\#$ 3	$(19/2^-)$	
$1012.8+x^\#$ 4	$(23/2^-)$	
$1433.7+x^\#$ 4	$(27/2^-)$	
$1912.7+x^\#$ 5	$(31/2^-)$	
$2446.6+x^\#$ 6	$(35/2^-)$	
$3033.6+x^\#$ 12	$(39/2^-)$	

† From E_γ data.

‡ Established by **2012Ma13** based on calculations and systematics.

$^\#$ Band(A): $\pi 3/2[541]$ band.

 $\gamma(^{153}\text{Pr})$

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	Comments
141.6 2		$141.6+x$	$(11/2^-)$	$0.0+x$	$(7/2^-)$		
221.0 2	70 30	$362.6+x$	$(15/2^-)$	$141.6+x$	$(11/2^-)$	Q	Mult.: $(291.8\gamma)(221.0\gamma)(\theta)$ consistent with QQ cascade.
291.8 2	100 10	$654.4+x$	$(19/2^-)$	$362.6+x$	$(15/2^-)$	Q	Mult.: $(291.8\gamma)(221.0\gamma)(\theta)$ consistent with QQ cascade. I_γ : 100 10 in ^{252}Cf SF decay.
358.4 2	105 10	$1012.8+x$	$(23/2^-)$	$654.4+x$	$(19/2^-)$		I_γ : 110 15 in ^{252}Cf SF decay.
420.9 2	67 7	$1433.7+x$	$(27/2^-)$	$1012.8+x$	$(23/2^-)$		I_γ : 85 9 in ^{252}Cf SF decay.

Continued on next page (footnotes at end of table)

^{248}Cm SF decay 2012Ma13 (continued) $\gamma(^{153}\text{Pr})$ (continued)

E_γ [†]	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
479.0 2	27 4	1912.7+x	(31/2 ⁻)	1433.7+x	(27/2 ⁻)	I_γ : 30 4 in ^{252}Cf SF decay.
533.9 3	14 3	2446.6+x	(35/2 ⁻)	1912.7+x	(31/2 ⁻)	I_γ : 18 4 in ^{252}Cf SF decay.
586 [#] 1	8 4	3033.6+x	(39/2 ⁻)	2446.6+x	(35/2 ⁻)	

[†] Same energy values are reported for both ^{248}Cm SF decay and ^{252}Cf SF decay studies.

[‡] From ^{248}Cm SF decay. Values from ^{252}Cf SF decay are given in comments.

[#] Placement of transition in the level scheme is uncertain.

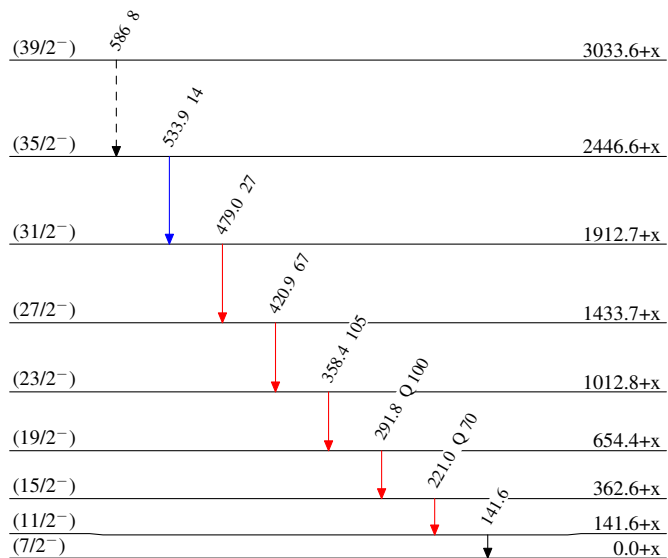
 ^{248}Cm SF decay 2012Ma13

Legend

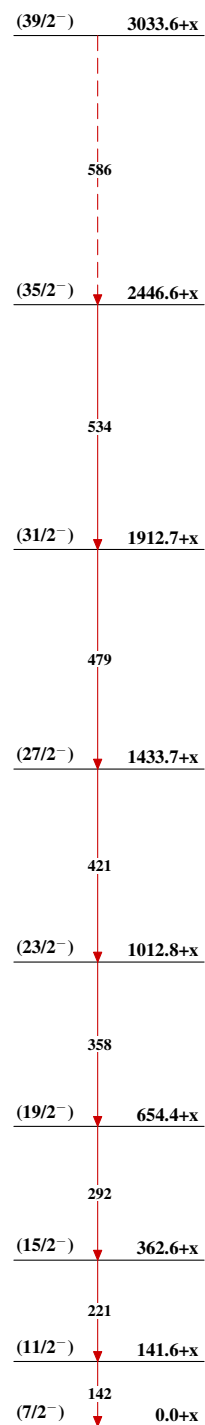
Level Scheme

Intensities: Relative I_γ

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
 —————→ $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
 —————→ $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
 - - - - -→ γ Decay (Uncertain)



$^{153}_{59}\text{Pr}_{94}$

^{248}Cm SF decay 2012Ma13Band(A): $\pi 3/2[541]$ band $^{153}_{59}\text{Pr}_{94}$