

^{252}Cf SF decay 2017Hu09

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Parent: ^{252}Cf : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=2.645$ y δ ; %SF decay=3.092 δ

Data set based on XUNDL file compiled by J. Chen (NSCL/MSU).

2017Hu09: Used ^{252}Cf source sandwiched between two Fe foils and placed in the center of Gammasphere detector array at Lawrence Berkeley National Laboratory consisting of 101 Compton-suppressed Ge detectors. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin, $\gamma\gamma\gamma$ -coin, $\gamma\gamma\gamma\gamma$ -coin, $\gamma\gamma(\theta)$ and deduced levels, J, π , γ -ray multiplicities. Comparisons with Reflection asymmetric shell-model (RASM) calculations and systematics of neighboring nuclei.

2017Hu09 confirm and extend the level scheme obtained previously by 2000Ur04 and 1996Be06 (see ^{248}Cm SF decay dataset).

 ^{141}Xe Levels

E(level) [†]	J^π [‡]	Comments
0.0 [@]	5/2 ⁽⁻⁾	J^π : adopted value.
35.7	(7/2 ⁻)	
112.6 [@]	(9/2 ⁻)	
482.6 [@]	(13/2 ⁻)	
553.0 ^a	(11/2 ⁻)	
998.4 [@]	(17/2 ⁻)	
1030.5 ^a	(15/2 ⁻)	
1156.2 ^b	(13/2 ⁺)	
1332.8 ^{&}	(15/2 ⁺)	
1495.9 ^b	(17/2 ⁺)	
1546.8 ^{ac}	(19/2 ⁻)	
1671.1 ^{&}	(19/2 ⁺)	
1680.2 [@]	(21/2 ⁻)	
1974.7 ^b	(21/2 ⁺)	
1981.3 [#]	(21/2 ⁻)	
2135.0 ^{&}	(23/2 ⁺)	
2153.8 ^{ac}	(23/2 ⁻)	
2397.9 [@]	(25/2 ⁻)	
2546.9 [#]	(25/2 ⁻)	
2577.1 ^b	(25/2 ⁺)	
2697.0 ^{&}	(27/2 ⁺)	
2847.4 ^{ac}	(27/2 ⁻)	
3107.6 [@]	(29/2 ⁻)	
3146.4 ^{bc}	(29/2 ⁺)	
3365.6 ^{&}	(31/2 ⁺)	
3925.7 ^{@c}	(33/2 ⁻)	
4081.1 ^{&c}	(35/2 ⁺)	

[†] As given in 2017Hu09.

[‡] Based on band structures and $\gamma\gamma(\theta)$.

Band(A): Band based on (21/2⁻).

@ Band(B): Simplex=-i, $\pi=-$ and g.s. band.

& Band(C): Simplex=-i, $\pi=+$ band.

^a Band(D): Simplex=+i, $\pi=-$ band. Band built on (9/2⁻), 552 level. Unlike 2000Ur04 who placed the head of this band on the

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^{252}Cf SF decay **2017Hu09** (continued)

^{141}Xe Levels (continued)

$7/2^{-}$, 36 level by observing the connecting 516.5 γ (see ^{248}Cm SF decay dataset) **2017Hu09** could not confirm the existence of this transition which determined the adoption the higher-lying bandhead. They also argue that 516.5 γ is too large in energy to meet the characteristics of a collective rotational band.

^b Band(E): Simplex=+i, π =+ band.

^c Newly identified level in **2017Hu09**.

E_{γ}^{\dagger}	I_{γ}	$E_i(\text{level})$	J_i^{π}	E_f	J_f^{π}	Mult. [‡]	$\delta^{\#}$	$\gamma(^{141}\text{Xe})$	Comments
(35.7 [@])		35.7	(7/2 ⁻)	0.0	5/2 ⁻	[M1+E2]			
76.9	75.3 7	112.6	(9/2 ⁻)	35.7	(7/2 ⁻)	[M1+E2]			
112.6	21.9 4	112.6	(9/2 ⁻)	0.0	5/2 ⁻	[E2]			
149.0 ^{&}	0.6 2	2546.9	(25/2 ⁻)	2397.9	(25/2 ⁻)	[M1+E2]			
299.1 ^{&b}	<0.1	2697.0	(27/2 ⁺)	2397.9	(25/2 ⁻)	[E1]			
301.1 ^a	3.1 1	1981.3	(21/2 ⁻)	1680.2	(21/2 ⁻)	[M1+E2]			
338.3	1.4 1	1671.1	(19/2 ⁺)	1332.8	(15/2 ⁺)	[E2]			
339.7	5.6 5	1495.9	(17/2 ⁺)	1156.2	(13/2 ⁺)	[E2]			
370.0	100.0	482.6	(13/2 ⁻)	112.6	(9/2 ⁻)	[E2]			
423.3 ^{&}	<0.5	2577.1	(25/2 ⁺)	2153.8	(23/2 ⁻)	[E1]			
427.9 ^{&}	1.0 1	1974.7	(21/2 ⁺)	1546.8	(19/2 ⁻)	[E1]			
440.4	11.6 5	553.0	(11/2 ⁻)	112.6	(9/2 ⁻)	M1+E2	0.13		Mult.: from $\gamma\gamma(\theta)$ for 603.2-440.4 cascade (2017Hu09).
454.8	1.9 1	2135.0	(23/2 ⁺)	1680.2	(21/2 ⁻)	[E1]			
463.9	8.6 2	2135.0	(23/2 ⁺)	1671.1	(19/2 ⁺)	E2			$A_2=-0.085$ 18, $A_4=-0.035$ 28 for 463.9-672.7 cascade (2017Hu09).
465.4	5.3 3	1495.9	(17/2 ⁺)	1030.5	(15/2 ⁻)	(E1)			$A_2=+0.098$ 63, $A_4=-0.027$ 95 for 465.4-547.9 cascade (2017Hu09).
473.6 ^{&}	2.3 1	2153.8	(23/2 ⁻)	1680.2	(21/2 ⁻)	[M1+E2]			
477.5	5.3 3	1030.5	(15/2 ⁻)	553.0	(11/2 ⁻)	[E2]			
478.8	4.0 2	1974.7	(21/2 ⁺)	1495.9	(17/2 ⁺)	[E2]			
497.5	0.8 1	1495.9	(17/2 ⁺)	998.4	(17/2 ⁻)	[E1]			
515.8	62.5 11	998.4	(17/2 ⁻)	482.6	(13/2 ⁻)	E2			Mult.: from $\gamma\gamma(\theta)$ for 548.4-515.8 cascade (2017Hu09).
516.3 ^{&}	0.9 1	1546.8	(19/2 ⁻)	1030.5	(15/2 ⁻)	[E2]			
547.9	8.4 3	1030.5	(15/2 ⁻)	482.6	(13/2 ⁻)	M1+E2	-0.15		Mult.: from $\gamma\gamma(\theta)$ for 465.4-547.9 cascade (2017Hu09).
548.4 ^{&}	4.9 1	1546.8	(19/2 ⁻)	998.4	(17/2 ⁻)	M1+E2	0.19		$A_2=+0.041$ 38, $A_4=+0.064$ 57 for 548.4-515.8 cascade (2017Hu09).
562.0	4.9 1	2697.0	(27/2 ⁺)	2135.0	(23/2 ⁺)	[E2]			
565.6 ^a	1.2 1	2546.9	(25/2 ⁻)	1981.3	(21/2 ⁻)	[E2]			
569.3 ^{&}	0.8 1	3146.4	(29/2 ⁺)	2577.1	(25/2 ⁺)	[E2]			
602.4	2.5 2	2577.1	(25/2 ⁺)	1974.7	(21/2 ⁺)	[E2]			
603.2	4.6 4	1156.2	(13/2 ⁺)	553.0	(11/2 ⁻)	(E1)			$A_2=+0.007$ 91, $A_4=+0.20$ 14 for 603.2-440.4 cascade (2017Hu09).
607.0 ^{&}	1.8 1	2153.8	(23/2 ⁻)	1546.8	(19/2 ⁻)	[E2]			
668.6	2.3 1	3365.6	(31/2 ⁺)	2697.0	(27/2 ⁺)	[E2]			
672.7	10.9 2	1671.1	(19/2 ⁺)	998.4	(17/2 ⁻)	(E1)			$A_2=-0.051$ 18, $A_4=-0.009$ 28 for 672.7-515.8 cascade (2017Hu09).
673.6	3.4 2	1156.2	(13/2 ⁺)	482.6	(13/2 ⁻)	[E1]			
681.8	16.0 4	1680.2	(21/2 ⁻)	998.4	(17/2 ⁻)	[E2]			
693.6 ^{&}	0.7 1	2847.4	(27/2 ⁻)	2153.8	(23/2 ⁻)	[E2]			
709.7	2.1 1	3107.6	(29/2 ⁻)	2397.9	(25/2 ⁻)	[E2]			

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^{252}Cf SF decay 2017Hu09 (continued) $\gamma(^{141}\text{Xe})$ (continued)

<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>	<u>Mult.</u> [‡]
715.5 ^{&}	0.8 <i>I</i>	4081.1	(35/2 ⁺)	3365.6	(31/2 ⁺)	[E2]
717.7	4.1 <i>I</i>	2397.9	(25/2 ⁻)	1680.2	(21/2 ⁻)	[E2]
818.1 ^{&}	0.5 <i>I</i>	3925.7	(33/2 ⁻)	3107.6	(29/2 ⁻)	[E2]
850.2	5.5 <i>I</i>	1332.8	(15/2 ⁺)	482.6	(13/2 ⁻)	[E1]
866.7 ^a	1.1 <i>I</i>	2546.9	(25/2 ⁻)	1680.2	(21/2 ⁻)	[E2]

[†] As given in 2017Hu09. No uncertainties are given in 2017Hu09.

[‡] 2017Hu09 adopted multiplicities (firmly or tentatively) for all γ transitions assigned to their level scheme with no experimental evidence, except for eight transitions (grouped in five two-transition cascades) for which they provided measured angular correlation coefficients (also compared with theoretical calculations). For this reason for values missing the evidence the evaluator adopted their assignments as deduced from the J^π values of the band levels (in brackets). Existing $\gamma\gamma(\theta)$ data are listed in comments from Table 2 “Angular correlations”, from which primarily the J^π values of the levels implied in each γ cascade are deduced, then the corresponding γ -ray multiplicities are extracted.

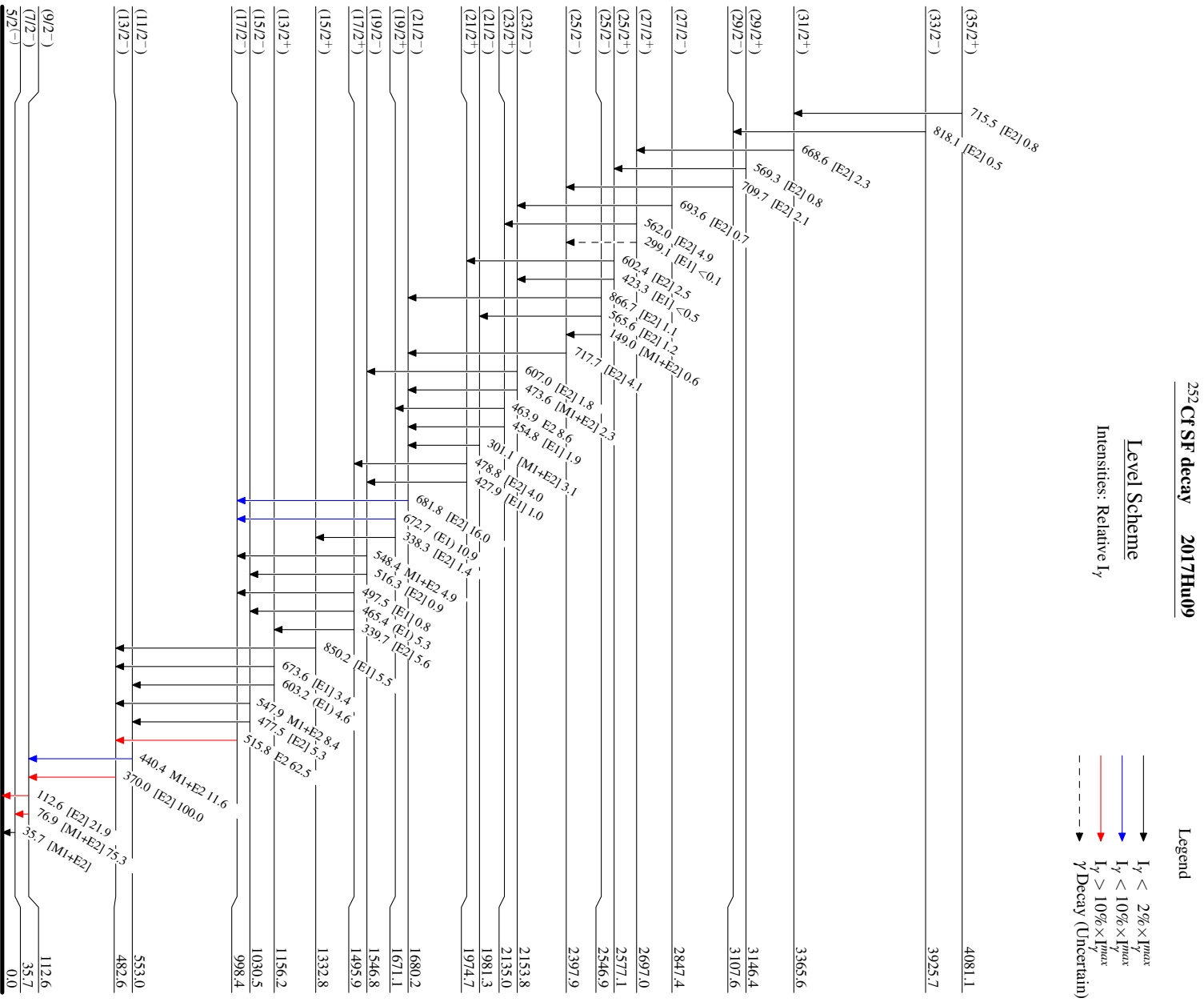
[#] From $\gamma\gamma(\theta)$ in 2017Hu09.

[@] From adopted gammas (not observed in 2017Hu09).

[&] Transition identified in 2017Hu09 that was not observed in ^{248}Cm SF decay dataset.

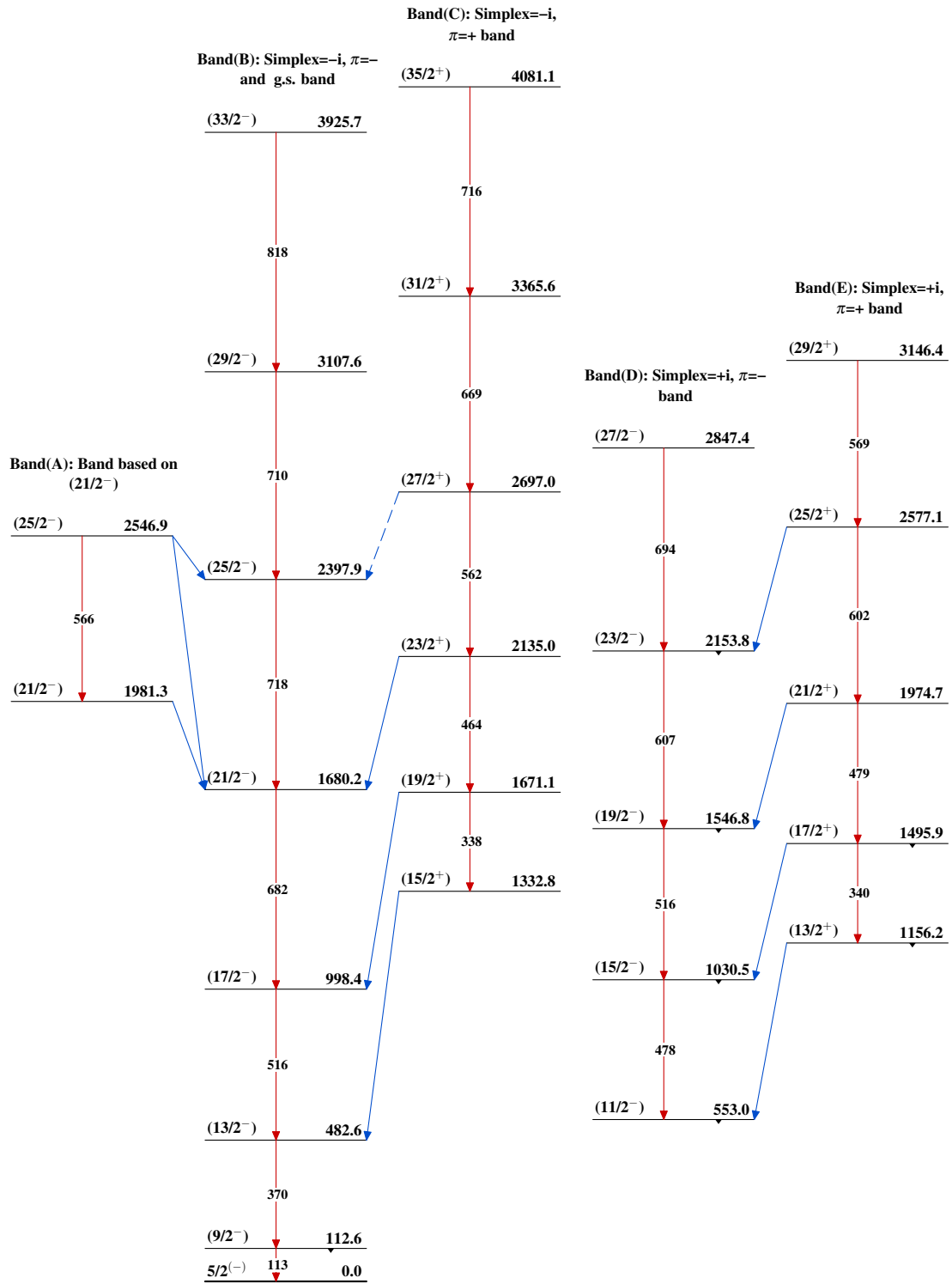
^a Transition identified in 2017Hu09 and 1996Be06 but not in 2000Ur04.

^b Placement of transition in the level scheme is uncertain.



¹⁴¹Xe₈₇
⁵⁴Xe₈₇

^{252}Cf SF decay 2017Hu09



$^{141}_{54}\text{Xe}_{87}$