^{252}Cf SF decay 2014Li46

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and B. Singh	NDS 181, 1 (2022)	9-Mar-2022

Parent: ^{252}Cf: E=0.0; $J^\pi=0^+$; $T_{1/2}$=2.645 y *8*; %SF decay=3.092 *8*

^{252}Cf-E,J^π,$T_{1/2}$: from 2005Ni22 (Adopted Levels).

Data set based on XUNDL files for 2014Li46 compiled by B. Singh, and 1999Sa58 compiled by J. Chenkin and B. Singh (McMaster).

2014Li46: measured Eγ, Iγ, γγ coin (3- and 4-fold) using the Gammasphere array of 101 Compton-suppressed Ge detectors at LBNL. Deduced levels,

1999Sa58: measured Eγ, γγγ using the Gammasphere array of 72 Compton suppressed Ge detectors. No Iγ′s and ΔEγ′s are reported.

Other: 1995Bu38 J, π, bands, octupole correlations. Comparison with reflection asymmetric shell model calculations for the octupole band structure.

^{147}Ce Levels

E(level)[†]	J^π	Comments
0.0	(5/2$^-$)	
118.0	(7/2$^-$)	
274.3[&]		
401.5[‡]	(9/2$^+$)	
484.5[‡]	(13/2$^+$)	
509.2[a]		
634.9[&]		
735.9[‡]	(17/2$^+$)	
862.0[a]		
1127.4[‡]	(21/2$^+$)	
1156.7[&]		
1369.1[#]	(19/2$^-$)	
1628.2[‡]	(25/2$^+$)	
1713.9[#]	(23/2$^-$)	
1771.1[&]		
1870.2[@]	(21/2)	
2154.2[@]	(25/2)	
2194.6[#]	(27/2$^-$)	
2216.5[‡]	(29/2$^+$)	
2614.4[@]	(29/2)	
2703.1[#]	(31/2$^-$)	B(E1; 486.6γ)/B(E2; 508.5γ)=0.72×10^{-4} b^{-1} *8* (2014Li46).
2876.1[‡]	(33/2$^+$)	
3264.0[#]	(35/2$^-$)	B(E1; 387.9γ)/B(E2; 560.9γ)=0.95×10^{-4} b^{-1} *12* (2014Li46).
3472[‡]	(37/2$^+$)	
3852[#]	(39/2$^-$)	
3956[‡]	(41/2$^+$)	
4552[‡]	(45/2$^+$)	

[†] From least-squares fit to Eγ′s. As no uncertainties are available for the Eγ input, the E(level) values are calculated with the assumption that the uncertainties are the same (of 0.5 keV) for all the Eγ′s.

[‡] Band(A): Band based on (9/2$^+$). This band and the negative-parity band based on (19/2$^-$) are interpreted by 2014Li46 as an

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^{252}Cf SF decay 2014Li46 (continued)

^{147}Ce Levels (continued)

octupole structure with simplex quantum number s=+i. The two bands are connected by E1 transitions. Theoretical calculations by 2014Li46 show that the s=+i octupole band structure originates from the $i_{13/2}$ 1/2[660] neutron orbital with K=1/2.

[#] Band(B): Band based on $(19/2^-)$. This band and the positive-parity band based on $(9/2^+)$ are interpreted as an octupole structure with simplex quantum number s=+i. The two bands are connected by E1 transitions. See also comment for band based on $(9/2^+)$.

[@] Band(C): Band based on (21/2).

[&] Band(b): Cascade 4.

[a] Band(c): Cascade 5.

$\gamma(^{147}Ce)$

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]
83.0	17.0 *7*	484.5	$(13/2^+)$	401.5	$(9/2^+)$	(E2)		4.02 *11*
118.0	63.5 *12*	118.0	$(7/2^-)$	0.0	$(5/2^-)$	M1+E2	1.1	0.96 *2*
156.2[#]		274.3		118.0	$(7/2^-)$			
234.9[#]		509.2		274.3				
241.7	1.3 *1*	1369.1	$(19/2^-)$	1127.4	$(21/2^+)$			
251.4	77.2 *14*	735.9	$(17/2^+)$	484.5	$(13/2^+)$	(E2)		0.086
274.3[#]		274.3		0.0	$(5/2^-)$			
283.5	100	401.5	$(9/2^+)$	118.0	$(7/2^-)$	E1		0.0144
284.0	≈1	2154.2	(25/2)	1870.2	(21/2)			
344.8	1.4 *1*	1713.9	$(23/2^-)$	1369.1	$(19/2^-)$	[E2]		0.0316
352.8[#]		862.0		509.2				
360.6[#]		634.9		274.3				
380.0	<0.5	3852	$(39/2^-)$	3472	$(37/2^+)$			
387.9	1.3 *1*	3264.0	$(35/2^-)$	2876.1	$(33/2^+)$	[E1]		
391.5	53.0 *10*	1127.4	$(21/2^+)$	735.9	$(17/2^+)$	(E2)		0.0216
419.8	1.1 *1*	2614.4	(29/2)	2194.6	$(27/2^-)$			
440.3	0.8 *1*	2154.2	(25/2)	1713.9	$(23/2^-)$			
460.2	0.7 *1*	2614.4	(29/2)	2154.2	(25/2)			
480.7[&]	<0.5	2194.6	$(27/2^-)$	1713.9	$(23/2^-)$			
483.5	1.2 *1*	3956	$(41/2^+)$	3472	$(37/2^+)$			
486.6	3.5 *2*	2703.1	$(31/2^-)$	2216.5	$(29/2^+)$	[E1]		
500.8	32.3 *8*	1628.2	$(25/2^+)$	1127.4	$(21/2^+)$	[E2]		0.0107
501.1	1.8 *1*	1870.2	(21/2)	1369.1	$(19/2^-)$			
508.5	1.1 *1*	2703.1	$(31/2^-)$	2194.6	$(27/2^-)$	[E2]		
521.8[#]		1156.7		634.9				
560.9	1.0 *1*	3264.0	$(35/2^-)$	2703.1	$(31/2^-)$	[E2]		
566.4	4.8 *3*	2194.6	$(27/2^-)$	1628.2	$(25/2^+)$			
586.5[&]	<0.5	1713.9	$(23/2^-)$	1127.4	$(21/2^+)$			
588.2	<0.5	3852	$(39/2^-)$	3264.0	$(35/2^-)$			
588.3	14.2 *4*	2216.5	$(29/2^+)$	1628.2	$(25/2^+)$			
595.8	<0.5	4552	$(45/2^+)$	3956	$(41/2^+)$			
596.1	2.5 *2*	3472	$(37/2^+)$	2876.1	$(33/2^+)$			
614.4[#]		1771.1		1156.7				
633.2	4.5 *3*	1369.1	$(19/2^-)$	735.9	$(17/2^+)$			
659.6	5.1 *3*	2876.1	$(33/2^+)$	2216.5	$(29/2^+)$			
742.8	3.7 *2*	1870.2	(21/2)	1127.4	$(21/2^+)$			

[†] From 2014Li4 unless mentioned otherwise (many of the γ decays also observed by 1999Sa58).

[‡] From Adopted dataset for ^{147}Ce, unless when these are assumed and listed in square brackets.

[#] From 1999Sa58 only.

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^{252}Cf SF decay 2014Li46 (continued)

$\gamma(^{147}Ce)$ (continued)

@ 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.

& Placement of transition in the level scheme is uncertain.

^{252}Cf SF decay 2014Li46

Level Scheme

Intensities: Relative I_γ

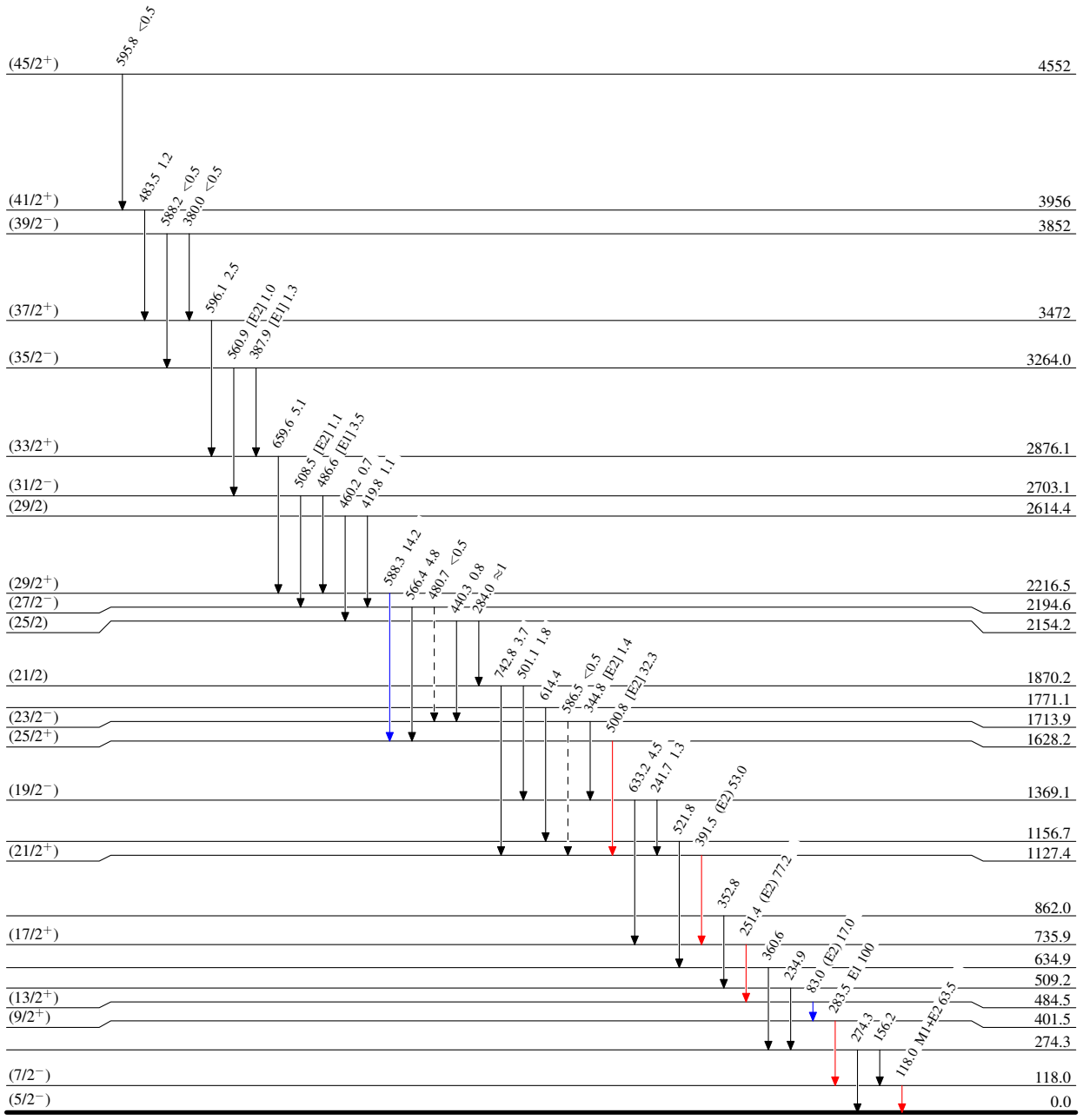
Legend

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

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

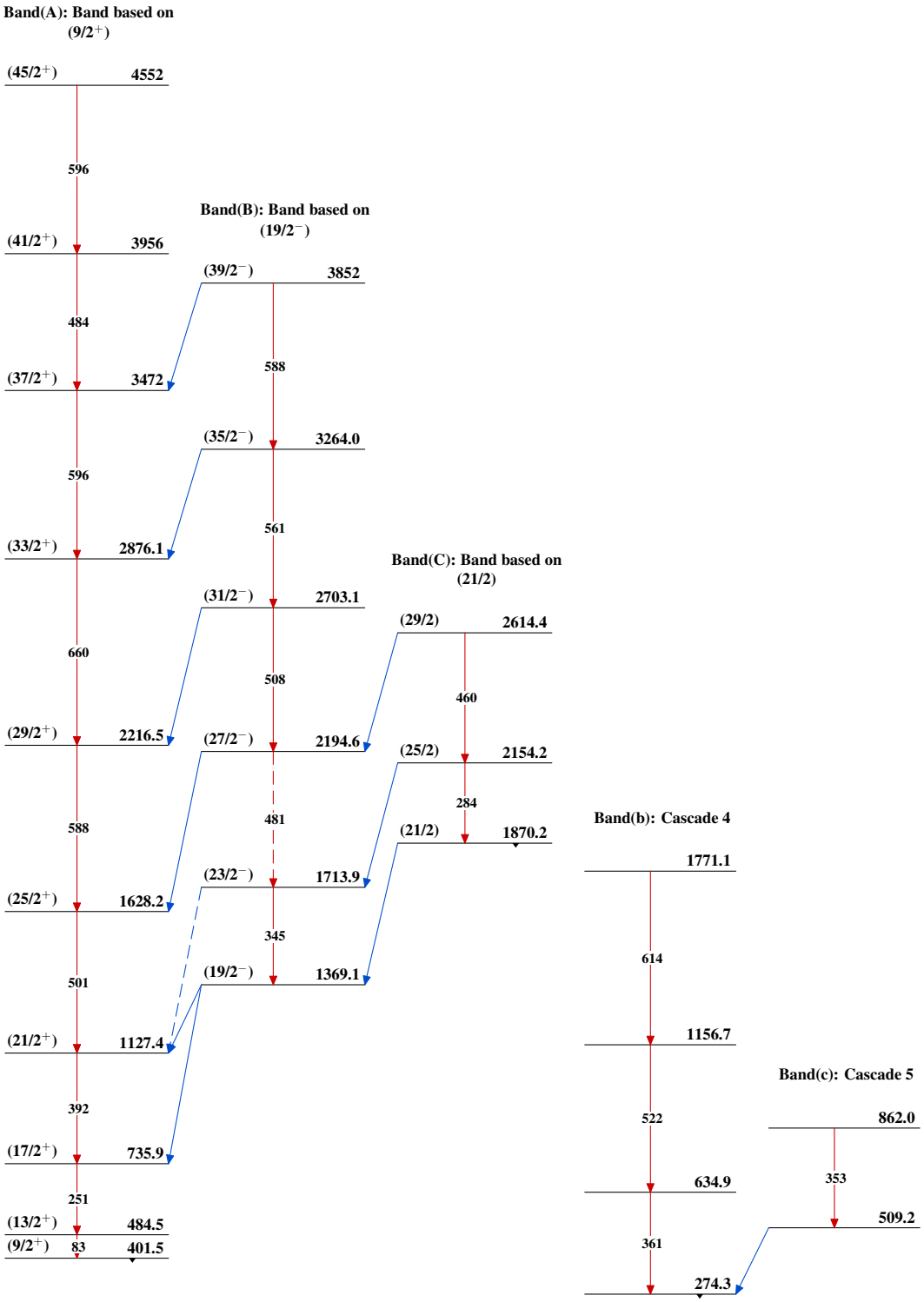
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{147}_{58}Ce_{89}$

^{252}Cf SF decay 2014Li46



$^{147}_{58}Ce_{89}$