

²⁵²Cf SF decay 2013Lu18

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	14-Jan-2022

Parent: ²⁵²Cf: E=0; J^π=0⁺; T_{1/2}=2.647 y 3; %SF decay=3.102 3

²⁵²Cf-T_{1/2}: From ²⁵²Cf Adopted Levels in the ENSDF database (Jan 2021 update).

²⁵²Cf-%SF decay: %SF(²⁵²Cf decay)=3.102% 3, from ²⁵²Cf Adopted Levels in the ENSDF database (Jan 2021 update).

2013Lu18 (also earlier work in **2001Zh05**, now superseded by **2013Lu18**: measured E_γ, I_γ, two- and multi-fold γγ-coin, and γγ(θ) measurements of prompt γ rays emitted in SF decay of ²⁵²Cf. The γ rays were detected by Gammasphere array consisting of 101 Compton-suppressed HPGe detectors at Lawrence Berkeley National Laboratory (LBNL), and using a ²⁵²Cf source of 62 μCi. The level scheme of ¹¹⁸Pd was extended from that reported in **2001Zh05** with the placement of nine new levels and nine new γ-transitions, in addition to other revisions in level scheme, spin-parity and band assignments. Discussed shape evolution features. **2002Ha46** is from the same group as **2013Lu18**, with a brief mention of a few low-lying levels in ¹¹⁸Pd. There is also an Erratum for **2013Lu18** published in Nucl. Phys. A983, 321 (2019), but with no corrections pointed for level scheme or in the E_γ and I_γ data for ¹¹⁸Pd.

¹¹⁸Pd Levels

Following levels were reported only in **2001Zh05**: 3236.4 (743.0γ), 1600.4, (4⁺) (787.8γ), and 2041.4, (5⁺) (858.8γ). These were not included in later analysis by **2013Lu18**.

E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π
0.0 [‡]	0 ⁺	1671.6 [‡] 8	6 ⁺	2493.0 [‡] 10	(8 ⁺)	3775.5 ^{&} 13	
378.5 [‡] 5	2 ⁺	1855.5 [#] 7	(5 ⁺)	2623.4 ^{&} 11		4143.3 [‡] 12	(12 ⁺)
812.6 [#] 5	2 ⁺	1989.6 [@] 8	(5 ⁻)	3030.0 [@] 10	(9 ⁻)	4389.1 [@] 12	(13 ⁻)
953.3 [‡] 7	4 ⁺	2180.4 [#] 9	(6 ⁺)	3093.8 ^{&} 12			
1182.6 [#] 5	3 ⁺	2210.9 ^{&} 10		3286.9 [‡] 11	(10 ⁺)		
1461.6 [#] 7	(4 ⁺)	2480.2 [@] 9	(7 ⁻)	3663.3 [@] 11	(11 ⁻)		

[†] From least-squares fit to E_γ data. Note that reduced χ² is 0.0, an exact fit, implying that E_γ values listed by **2013Lu18** may, in some cases, be fitted value rather than the actual measured values from analysis of γ-ray spectra. In addition, most levels decay by single γ rays.

[‡] Band(A): g.s. band.

[#] Band(B): γ band.

[@] Band(C): Band based on 5⁻.

[&] Band(D): Side band.

γ(¹¹⁸Pd)

Following γ rays were reported only in **2001Zh05**: 743.0γ from a 3236.4 level, 787.8γ from a 1600.4, (4⁺) level, and 858.8γ from a 2041.4, (5⁺) level. These were not included in later analysis by **2013Lu18**.

E _i (level)	J _i ^π	E _γ [†]	I _γ [†]	E _f	J _f ^π	Comments
378.5	2 ⁺	378.5 5	100	0.0	0 ⁺	
812.6	2 ⁺	434.1 5	100	378.5	2 ⁺	
		812.6 5	63.1	0.0	0 ⁺	
953.3	4 ⁺	574.8 5	100	378.5	2 ⁺	Additional information 1.
1182.6	3 ⁺	370.0 5	100	812.6	2 ⁺	

Continued on next page (footnotes at end of table)

^{252}Cf SF decay $^{2013}\text{Lu18}$ (continued) $\gamma(^{118}\text{Pd})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.	Comments
1182.6	3 ⁺	804.1 5	36.0	378.5	2 ⁺		
1461.6	(4 ⁺)	649.0 5	100	812.6	2 ⁺		
1671.6	6 ⁺	718.3 5	100	953.3	4 ⁺		Additional information 2.
1855.5	(5 ⁺)	672.9 5	100	1182.6	3 ⁺		
1989.6	(5 ⁻)	1036.3 5	100	953.3	4 ⁺		
2180.4	(6 ⁺)	718.8 5	100	1461.6	(4 ⁺)	Q	Mult.: From (821.4 γ)(718.3 γ)(θ).
2210.9		539.3 \ddagger 5	100	1671.6	6 ⁺		Ordering of the 412.5 γ \rightarrow 539.3 γ cascade in 2013Lu18 is determined from the intensity of the 539.3 γ as 18% 3 stronger than that of the 412.5 γ . This ordering is given in the Adopted dataset.
2480.2	(7 ⁻)	490.6 5	25.4	1989.6	(5 ⁻)		
		808.6 5	100	1671.6	6 ⁺		
2493.0	(8 ⁺)	821.4 5	100	1671.6	6 ⁺	Q	Additional information 3. Mult.: (821.4 γ)(718.3 γ)(θ): $A_2=+0.15$ 10, $A_4=+0.13$ 15 consistent with cascades of $\Delta J=2$, quadrupole transitions.
2623.4		412.5 \ddagger 5	100	2210.9			See comment for 539.3 γ from 2210.9 level.
3030.0	(9 ⁻)	549.8 5	100	2480.2	(7 ⁻)		
3093.8		470.4 \ddagger 5	100	2623.4			Additional information 4.
3286.9	(10 ⁺)	793.9 5	100	2493.0	(8 ⁺)		
3663.3	(11 ⁻)	633.3 5	100	3030.0	(9 ⁻)		
3775.5		681.7 \ddagger 5	100	3093.8			Additional information 5.
4143.3	(12 ⁺)	856.4 5	100	3286.9	(10 ⁺)		
4389.1	(13 ⁻)	725.8 5	100	3663.3	(11 ⁻)		

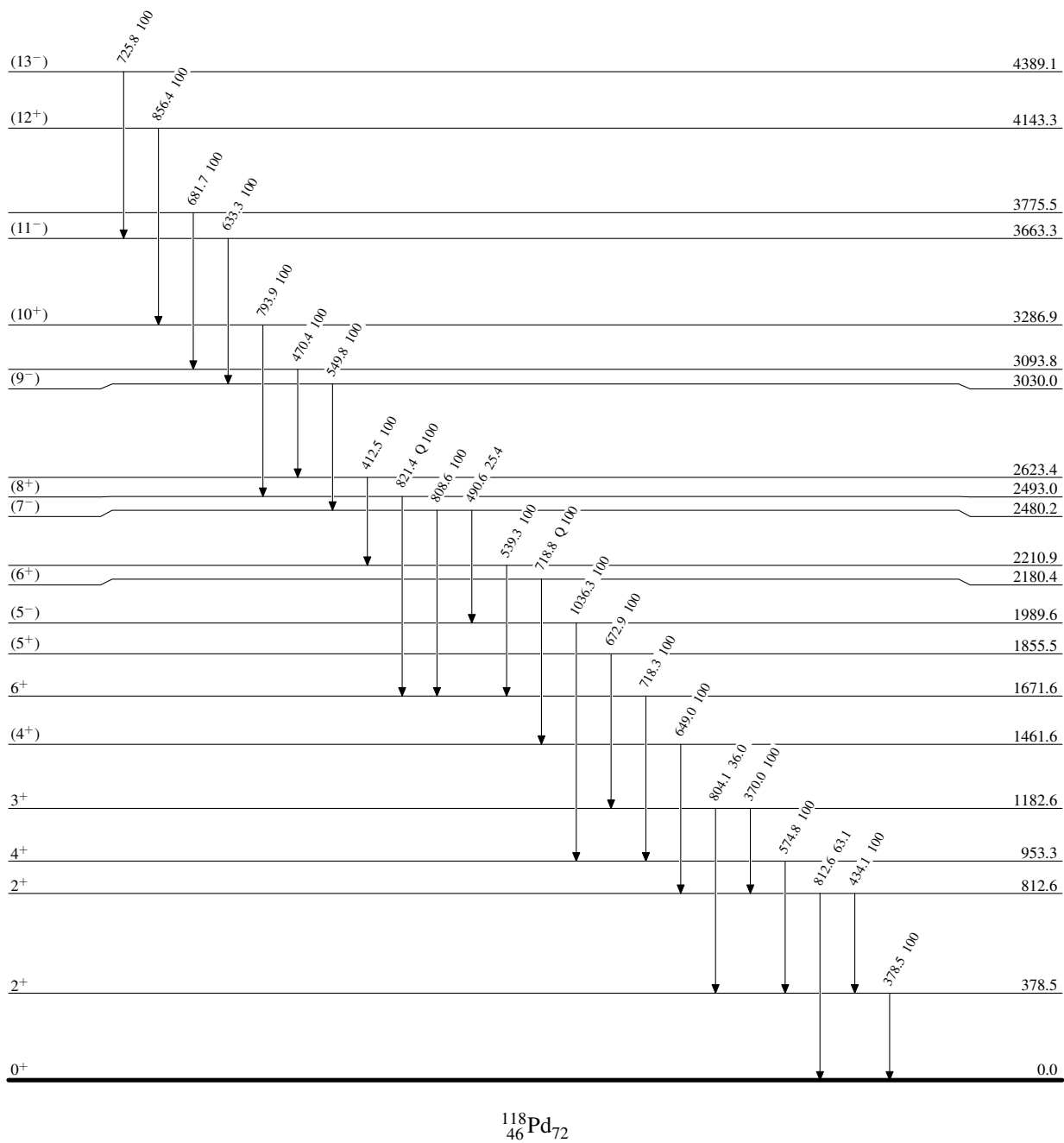
\dagger From [2013Lu18](#). Uncertainty of 0.5 keV is assigned for each E_γ value, as communicated in e-mail reply of Aug 15, 2016 from S.J. Zhu, author of [2016Hu16](#) (same group as [2013Lu18](#)) to XUNDL compiler of [2016Hu16](#) article for ^{114}Pd structure.

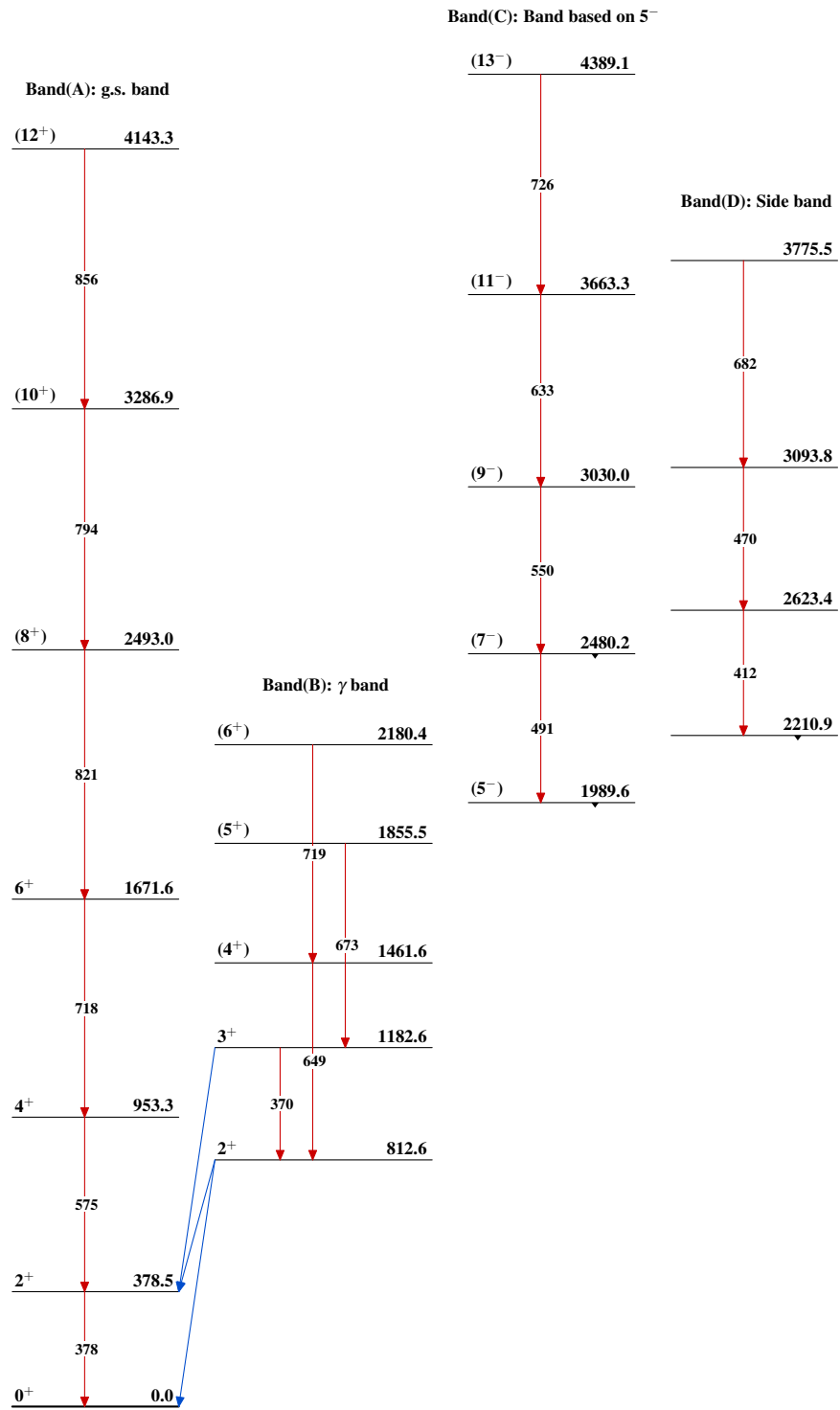
\ddagger 681.7 γ \rightarrow 470.4 γ \rightarrow 412.5 γ \rightarrow 539.3 γ cascade in [2013Lu18](#) is given as follows by [2007St19](#) in $^{238}\text{U}(\alpha, F\gamma)$ study: 539.3 γ \rightarrow 411.2 γ cascade with 827.4 γ \rightarrow 717.9 γ \rightarrow 468.6 γ cascade and 680.0 γ feeding this cascade.

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Level Scheme

Intensities: Relative photon branching from each level



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