^{252}Cf SF decay:XUNDL-4 2013Lu18

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

Compiled (unevaluated) dataset from 2013Lu18: Nucl Phys A 919, 67 (2013).

Compiled by A. Chakraborty (Krishnath College) and B. Singh (McMaster), January 15, 2014.

Level structure of ^{112}Pd was studied by means of Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma\gamma$, $\gamma\gamma\gamma\gamma$ and $\gamma\gamma(\theta)$ measurements of prompt gamma rays emitted by SF decay of ^{252}Cf. The γ rays were detected by Gammasphere array consisting of 101 Compton-suppressed Ge detectors at the Lawrence Berkeley National Laboratory. A ^{252}Cf source of 62 μCi was used. The level scheme of ^{112}Pd was extended with the placement of six new levels and fifteen new transitions. Discussed triaxial and chiral behavior including shape transitions.

^{112}Pd Levels

E(level)[†]	J^{π}	Comments
0.0[‡]	0^+	
348.8[‡] *2*	2^+	
736.9[#] *2*	2^+	
883.2[‡] *3*	4^+	
1096.7[#] *3*	3^+	
1362.5[#] *3*	4^+	
1550.9[‡] *3*	6^+	
1715.6 *3*	$(3^+,4^+)$	J^{π}: from Table 1 of 2013Lu19; listed as $(3^-,4^+)$ in authors′ level-scheme Figure 7.
1759.5[#] *3*	5^+	
2003.0[#] *3*	6^+	
2195.1 *3*	(4^-)	
2200.9 *3*		
2269.6[a] *4*	5^-	
2318.7[‡] *4*	8^+	
2355.0 *4*		
2430.6 *4*		
2464.0 *4*		
2484.0[#] *4*	7^+	
2579.2[b] *4*	(6^-)	
2615.2[&] *4*	(6^-)	
2639.2[#] *4*	(8^+)	
2692.4 *4*	(8^+)	
2704.8[a] *4*	7^-	
2711.2[@] *4*	7^-	
2755.4 *3*	(5^+)	
2899.7[b] *4*	(8^-)	
2912.8 *4*		
2966.9 *4*		
3046.4[&] *5*	(8^-)	
3050.6[‡] *4*	10^+	
3086.3[#] *4*	(9^+)	
3137.6[a] *4*	(9^-)	
3175.3[c] *5*		
3262.6 *5*		
3265.1[@] *4*	(9^-)	
3328.6[#] *4*	(10^+)	
3448.1[b] *4*	(10^-)	
3598.8[‡] *5*	12^+	
3627.8[#] *5*	(11^+)	
3655.5[&] *6*	(10^-)	

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^{252}Cf SF decay:XUNDL-4 2013Lu18 (continued)

^{112}Pd Levels (continued)

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
3745.3[a] 4	(11⁻)	4086.9 6		4392.5[&] 7	(12⁻)	5222.8[‡] 7	(16⁺)
3951.0[@] 4	(11⁻)	4117.2[b] 5	(12⁻)	4478.8[a] 5	(13⁻)	5302.5[a] 6	(15⁻)
4046.8[c] 6		4322.7[‡] 6	14⁺	4749.1[@] 5	(13⁻)	5612.7[@] 6	(15⁻)
4077.7[#] 5	(12⁺)	4329.3[#] 6	(13⁺)	4932.0[c] 7			

† From least-squares fit (by compilers) to Eγ data, assuming 0.3 keV uncertainty for each γ transition.
‡ Band(A): g.s. band.
# Band(B): γ band.
@ Band(C): Band based on 7⁻,α=1. Possible disturbed chiral structure.
& Band(c): Band based on (6⁻),α=0 Possible disturbed chiral structure.
a Band(D): Band based on 5⁻,α=1. Possible disturbed chiral structure.
b Band(d): Band based on (6⁻),α=0 Possible disturbed chiral structure.
c Band(E): γ cascade.

γ(^{112}Pd)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π
348.8	100	348.8	2⁺	0.0	0⁺
388.1	100	736.9	2⁺	348.8	2⁺
736.9	28.4			0.0	0⁺
534.4	100	883.2	4⁺	348.8	2⁺
213.4	7.0	1096.7	3⁺	883.2	4⁺
359.7	100			736.9	2⁺
747.9	68.5			348.8	2⁺
265.8	6.3	1362.5	4⁺	1096.7	3⁺
479.4	26.5			883.2	4⁺
625.6	100			736.9	2⁺
1013.7	9.4			348.8	2⁺
667.7	100	1550.9	6⁺	883.2	4⁺
618.9		1715.6	(3⁺,4⁺)	1096.7	3⁺
832.4				883.2	4⁺
978.7				736.9	2⁺
397.0	12.5	1759.5	5⁺	1362.5	4⁺
662.8	100			1096.7	3⁺
876.4	7.2			883.2	4⁺
243.5	16.8	2003.0	6⁺	1759.5	5⁺
640.5	100			1362.5	4⁺
435.6	27.7	2195.1	(4⁻)	1759.5	5⁺
479.5	61.5			1715.6	(3⁺,4⁺)
1098.4	100			1096.7	3⁺
1311.9	33.1			883.2	4⁺
485.3[†]		2200.9		1715.6	(3⁺,4⁺)
1317.8	100			883.2	4⁺
1386.4	100	2269.6	5⁻	883.2	4⁺
767.9	100	2318.7	8⁺	1550.9	6⁺
1471.8	100	2355.0		883.2	4⁺
1547.4	100	2430.6		883.2	4⁺
1580.8	100	2464.0		883.2	4⁺
724.5	100	2484.0	7⁺	1759.5	5⁺
309.6	8.0	2579.2	(6⁻)	2269.6	5⁻

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^{252}Cf SF decay:XUNDL-4 2013Lu18 (continued)

$\gamma(^{112}Pd)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
1028.3	100	2579.2	(6^-)	1550.9	6^+		
855.7	100	2615.2	(6^-)	1759.5	5^+		
636.2	100	2639.2	(8^+)	2003.0	6^+		
1088.2†				1550.9	6^+		
689.5	100	2692.4	(8^+)	2003.0	6^+		
1141.5	78.2			1550.9	6^+		
435.1	6.1	2704.8	7^-	2269.6	5^-		
1154.0	100			1550.9	6^+	D	Mult.: (1154.0γ)(667.7γ)(θ): A_2=−0.074 *21*, A_4=+0.011 *32* consistent with ΔJ=1 dipole and ΔJ=2, quadrupole cascade.
1160.4	100	2711.2	7^-	1550.9	6^+	D	Mult.: (1160.4γ)(667.7γ)(θ): A_2=−0.098 *37*, A_4=+0.008 *57* consistent with ΔJ=1 dipole and ΔJ=2, quadrupole cascade.
291.4	8.0	2755.4	(5^+)	2464.0			
324.7	5.0			2430.6			
400.4	85.6			2355.0			
485.9	29.4			2269.6	5^-		
554.5	18.2			2200.9			
560.3	50.1			2195.1	(4^-)		
995.8	45.2			1759.5	5^+		
1204.5	100			1550.9	6^+		
1658.7	2.5			1096.7	3^+		
1872.2	48.2			883.2	4^+		
188.4	93.8	2899.7	(8^-)	2711.2	7^-		
194.8	32.3			2704.8	7^-		
284.4	53.7			2615.2	(6^-)		
320.4	100			2579.2	(6^-)		
415.8	44.1			2484.0	7^+		
1153.3	100	2912.8		1759.5	5^+		
963.9	15.5	2966.9		2003.0	6^+		
1416.0	100			1550.9	6^+		
431.2	100	3046.4	(8^-)	2615.2	(6^-)		
411.4	12.1	3050.6	10^+	2639.2	(8^+)		
731.9	100			2318.7	8^+		
393.9	63.3	3086.3	(9^+)	2692.4	(8^+)		
602.3	100			2484.0	7^+		
237.9	17.4	3137.6	(9^-)	2899.7	(8^-)		
432.8	100			2704.8	7^-		
819.0	87.9			2318.7	8^+		E_γ: from Table 1 of 2013Lu18 as 819.0; listed as 819.4 in authors′ level-scheme Figure 7.
856.6	100	3175.3		2318.7	8^+		
778.6	100	3262.6		2484.0	7^+		
553.9	100	3265.1	(9^-)	2711.2	7^-		
946.5	34.6			2318.7	8^+		
689.4	100	3328.6	(10^+)	2639.2	(8^+)		
1009.9	97.5			2318.7	8^+		
310.5	87.0	3448.1	(10^-)	3137.6	(9^-)		
548.4	100			2899.7	(8^-)		
548.2	100	3598.8	12^+	3050.6	10^+		
541.5	100	3627.8	(11^+)	3086.3	(9^+)		
609.1	100	3655.5	(10^-)	3046.4	(8^-)		
297.2	8.2	3745.3	(11^-)	3448.1	(10^-)		
607.7	100			3137.6	(9^-)		
686.0	100	3951.0	(11^-)	3265.1	(9^-)		
900.2	25.0			3050.6	10^+		E_γ: from Table 1 of 2013Lu18; listed as 900.4 in authors′ level-scheme Figure 7.

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^{252}Cf SF decay:XUNDL-4 2013Lu18 (continued)

$\gamma(^{112}Pd)$ (continued)

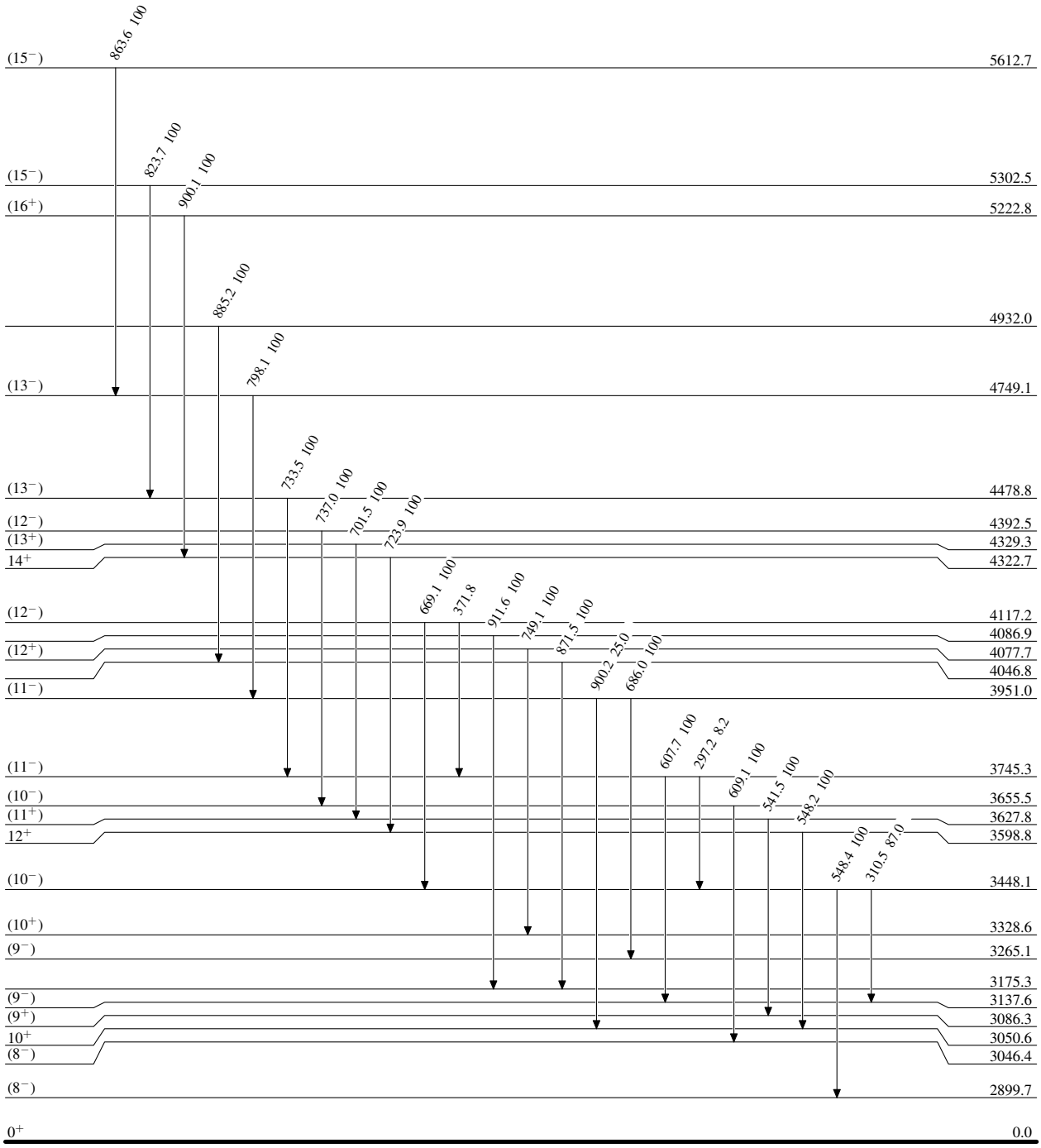
E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π
871.5	100	4046.8		3175.3		737.0	100	4392.5	(12^-)	3655.5	(10^-)
749.1	100	4077.7	(12^+)	3328.6	(10^+)	733.5	100	4478.8	(13^-)	3745.3	(11^-)
911.6	100	4086.9		3175.3		798.1	100	4749.1	(13^-)	3951.0	(11^-)
371.8		4117.2	(12^-)	3745.3	(11^-)	885.2	100	4932.0		4046.8	
669.1	100			3448.1	(10^-)	900.1	100	5222.8	(16^+)	4322.7	14^+
723.9	100	4322.7	14^+	3598.8	12^+	823.7	100	5302.5	(15^-)	4478.8	(13^-)
701.5	100	4329.3	(13^+)	3627.8	(11^+)	863.6	100	5612.7	(15^-)	4749.1	(13^-)

† This γ from level-scheme figure 7 of 2013Lu18; not listed in authors′ Table 1.

^{252}Cf SF decay:XUNDL-4 2013Lu18

Level Scheme

Intensities: Relative photon branching from each level

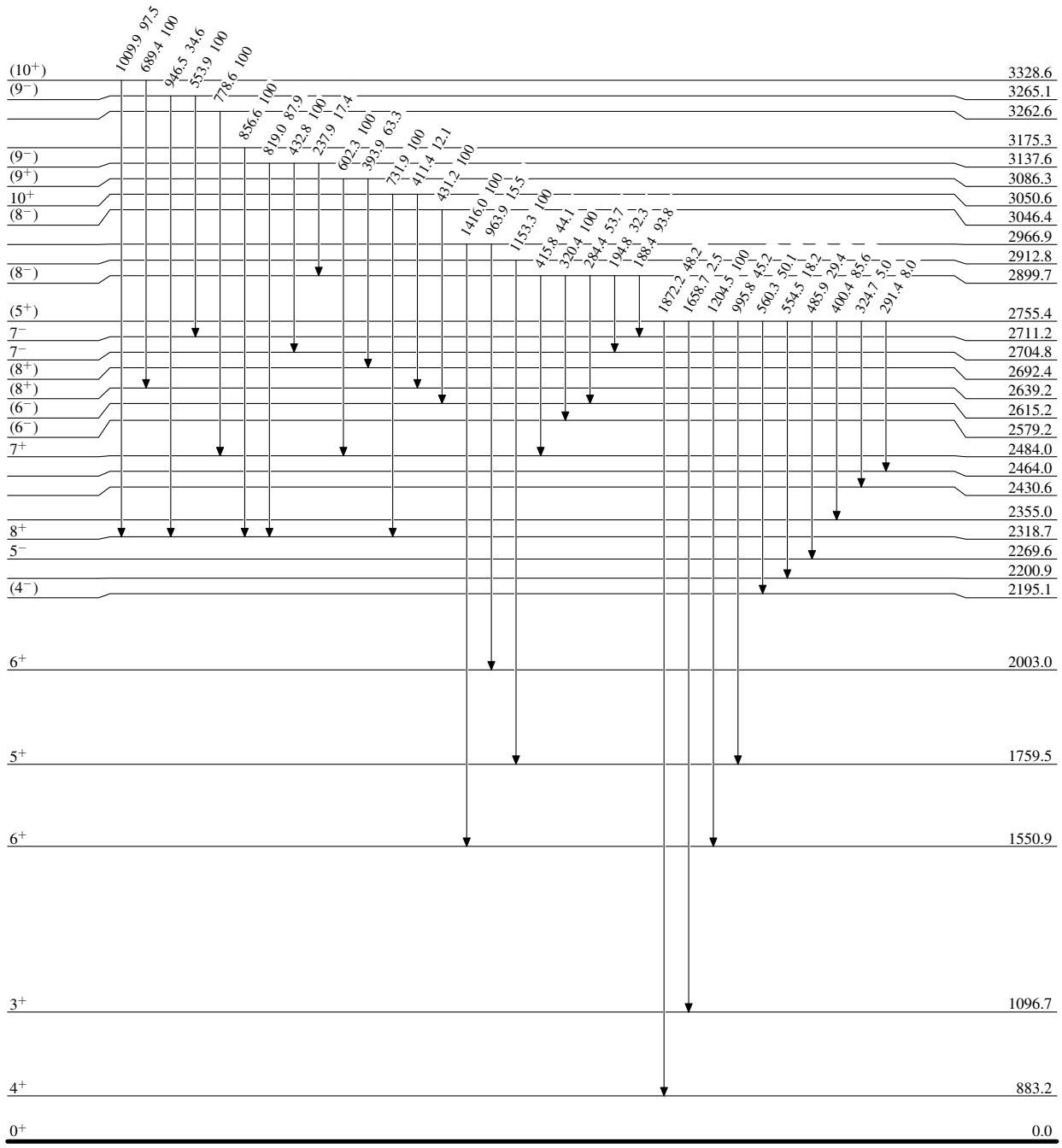


$^{112}_{46}Pd_{66}$

^{252}Cf SF decay:XUNDL-4 2013Lu18

Level Scheme (continued)

Intensities: Relative photon branching from each level

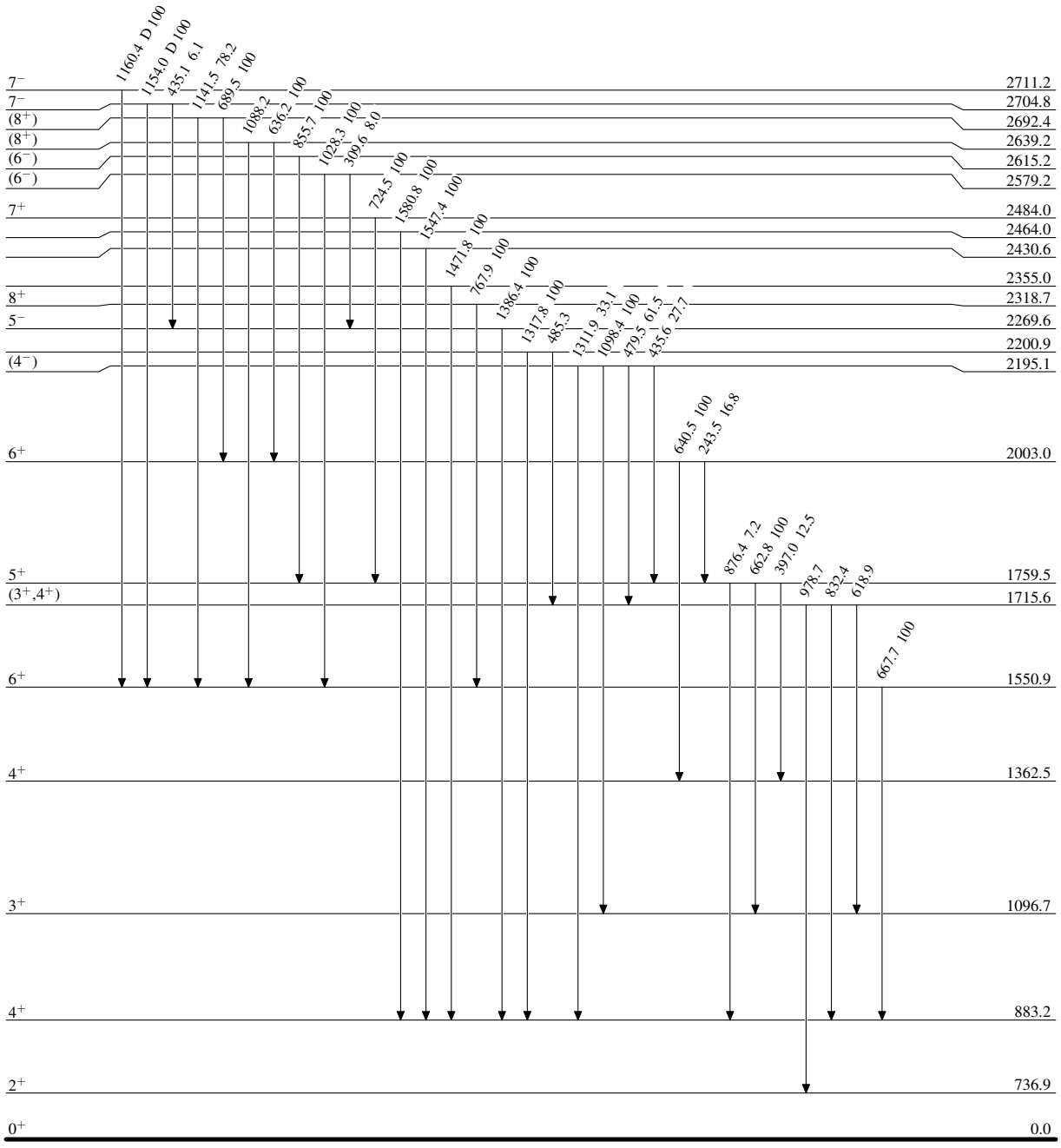


$^{112}_{46}Pd_{66}$

^{252}Cf SF decay:XUNDL-4 2013Lu18

Level Scheme (continued)

Intensities: Relative photon branching from each level

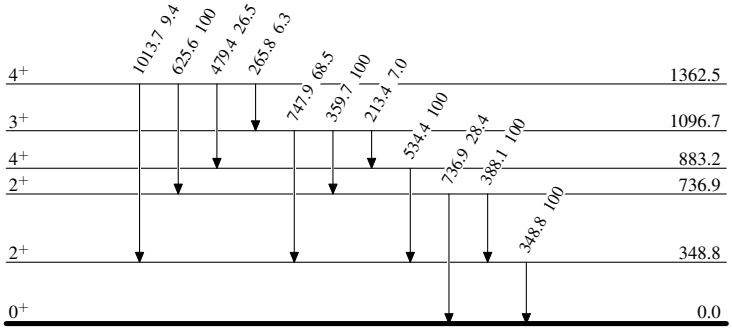


$^{112}_{46}Pd_{66}$

^{252}Cf SF decay:XUNDL-4 2013Lu18

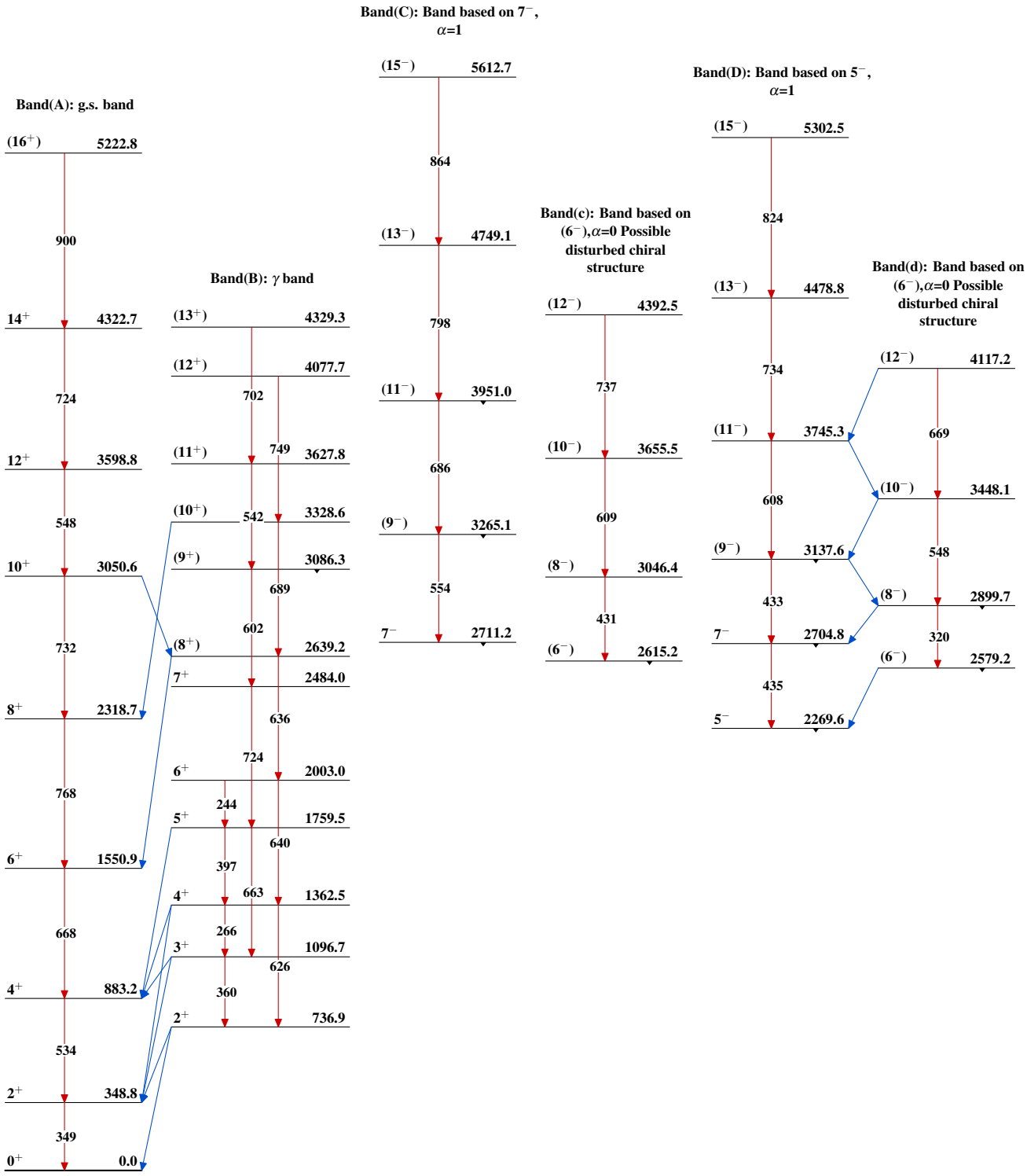
Level Scheme (continued)

Intensities: Relative photon branching from each level



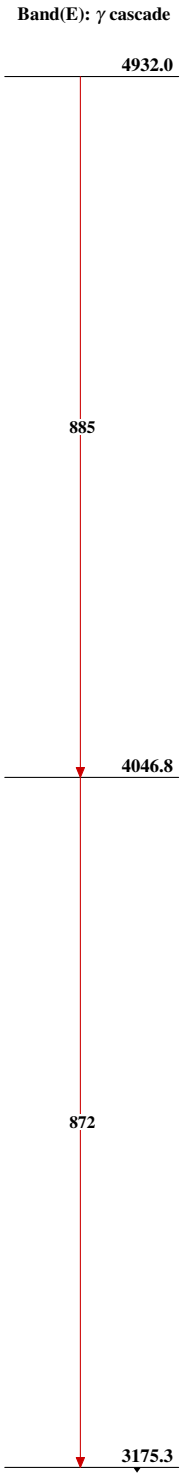
$^{112}_{46}Pd_{66}$

^{252}Cf SF decay:XUNDL-4 2013Lu18



$^{112}_{46}Pd_{66}$

^{252}Cf SF decay:XUNDL-4 2013Lu18 (continued)



$^{112}_{46}Pd_{66}$