

Adopted Levels, Gammas

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

Q(β^-)=6280 10; S(n)=3282 4; S(p)=11880 12; Q(α)=-1318 4 2021Wa16
 S(2n)=8695 4, S(2p)=22570 5, Q(β^- n)=781 9 (2021Wa16).
 Measured production cross-section from ²⁰⁸Pb(²³⁸U,F), ⁹Be(²³⁸U,F), E=950 MeV/A (2019Pe09).
 Measured yields from different photofission reactions: 2005Ga25, 2005Ga50, 2004Ga60, 2003Ga21, 2000Ga60, 2000Lh02.
 Theory: 2007Ji14, 2006Ks01.
 $\langle r^2 \rangle^{1/2}$ =4.8694 fm 147 (2013An02).

¹⁴¹Xe Levels

Cross Reference (XREF) Flags

- A ¹⁴¹I β^- decay
- B ²⁴⁸Cm SF decay
- C ²⁵²Cf SF decay

E(level) [†]	J π^{\ddagger}	T _{1/2}	XREF	Comments
0.0 [@]	5/2 ⁽⁻⁾	1.73 s 1	ABC	% β^- =100; % β^- n=0.044 5 μ =+0.010 4 (2014StZZ,1989Bo03) Q=-0.57 2 (2016St14,1989Bo03) T _{1/2} : from 1969Ta04. Others: 1.72 s 3 (1976Ot03), 1.720 s 13 (1969Ca03), 1.79 s 3 (1971Kr22), 1.81 s 10 (1972Am01); see also 1967Co31. J π : hfs (LASER) (1989Bo03), $\pi=-$ is suggested by 1989Bo03 from analogy with levels of similar μ in neighboring ¹⁴³ Ba. 1996Be06 suggest Nilsson orbital [523]5/2 assignment. Bandhead of simplex=-i, $\pi=-$ g.s. band. % β^- n: 0.044% 5 (1981ReZW). Others: 0.0426% 23 (1975As03,1975As05), see also 1969Ta04. μ : measured by collinear fast beam laser spectroscopy (1989Bo03). Q: measured by resonance cell laser spectroscopy (1989Bo03).
35.7	7/2 ⁽⁻⁾		BC	J π : M1+E2 γ to 5/2 ⁽⁻⁾ .
112.6 [@]	9/2 ⁽⁻⁾		BC	J π : M1(+E2) γ to 7/2 ⁽⁻⁾ .
482.6 [@]	13/2 ⁽⁻⁾		BC	J π : E2 γ to 9/2 ⁽⁻⁾ .
553.0 ^a	11/2 ⁽⁻⁾		BC	J π : M1+E2 γ to 9/2 ⁽⁻⁾ . Bandhead of simplex=+i, $\pi=-$ band.
998.4 [@]	17/2 ⁽⁻⁾		BC	J π : E2 γ to 13/2 ⁽⁻⁾ .
1030.5 ^a	15/2 ⁽⁻⁾		BC	J π : M1+E2 γ to 13/2 ⁽⁻⁾ .
1156.2 ^b	(13/2 ⁺)		BC	J π : bandhead of simplex=+i, $\pi=+$ band.
1332.8 ^{&}	(15/2 ⁺)		BC	J π : bandhead of simplex=-i, $\pi=+$ band.
1495.9 ^b	17/2 ⁽⁺⁾		BC	J π : E1 γ to 15/2 ⁽⁻⁾ .
1546.8 ^a	19/2 ⁽⁻⁾		C	J π : M1+E2 γ to 17/2 ⁽⁻⁾ .
1671.1 ^{&}	19/2 ⁽⁺⁾		BC	J π : E1 γ to 17/2 ⁽⁻⁾ .
1680.2 [@]	21/2 ⁽⁻⁾		BC	J π : E2 γ to 17/2 ⁽⁻⁾ .
1974.7 ^b	(21/2 ⁺)		BC	
1981.3 [#]	(21/2 ⁻)		BC	J π : bandhead postulated in 2017Hu09 (²⁵² Cf SF decay).
2135.0 ^{&}	23/2 ⁽⁺⁾		BC	J π : E2 γ to 19/2 ⁽⁺⁾ .
2153.8 ^a	(23/2 ⁻)		C	
2397.9 [@]	(25/2 ⁻)		BC	
2546.9 [#]	(25/2 ⁻)		BC	
2577.1 ^b	(25/2 ⁺)		BC	
2697.0 ^{&}	(27/2 ⁺)		BC	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{141}Xe Levels (continued)

<u>E(level)[†]</u>	<u>Jπ[‡]</u>	<u>XREF</u>
2847.4 ^a	(27/2 ⁻)	C
3107.6 [@]	(29/2 ⁻)	BC
3146.4 ^b	(29/2 ⁺)	C
3365.6 ^{&}	(31/2 ⁺)	BC
3925.7 [@]	(33/2 ⁻)	C
4081.1 ^{&}	(35/2 ⁺)	C

[†] From ^{252}Cf SF decay ([2017Hu09](#)).

[‡] Based on γ -ray multipolarities from $\gamma\gamma(\theta)$, linear pol, and /or band assignments in ^{248}Cm SF decay and ^{252}Cf SF decay datasets as well as the fact that J values generally increase with excitation energy for heavy-ions induced reactions.

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 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 (see ^{252}Cf SF decay dataset).

^b Band(E): Simplex=+i, $\pi=+$ band.

Adopted Levels, Gammas (continued) $\gamma(^{141}\text{Xe})$

Data are mainly from ²⁵²Cf SF decay (2017Hu09) which confirmed and enlarged data from ²⁴⁸Cm SF decay (2000Ur04).

Additional information 1.

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult.#	$\delta^{\#\&}$	$a^@$	Comments
35.7	7/2 ⁽⁻⁾	35.6	100	0.0	5/2 ⁽⁻⁾	M1+E2	0.0 5	16 14	$\alpha(\text{K})=13.8\ 9$; $\alpha(\text{L})=2\ 12$; $\alpha(\text{M})=0\ 3$ $\alpha(\text{N})=0.1\ 5$; $\alpha(\text{O})=0.01\ 5$ E_γ : from 2000Ur04 and 1996Be06 (²⁴⁸ Cm SF decay). Mult.: from $\alpha(\text{K})\text{exp}=14\ 1$ (2000Ur04). δ : from $\alpha(\text{K})\text{exp}$.
112.6	9/2 ⁽⁻⁾	76.9	100.0 9	35.7	7/2 ⁽⁻⁾	M1(+E2)	0.00 26	1.74 19	$\alpha(\text{K})=1.49\ 8$; $\alpha(\text{L})=0.20\ 9$; $\alpha(\text{M})=0.040\ 19$ $\alpha(\text{N})=0.008\ 4$; $\alpha(\text{O})=0.0010\ 4$ $\alpha(\text{exp})$: 1.4 4 (1996Be06). Mult.: from $\alpha(\text{exp})$, $\gamma\gamma(\theta)$. δ : from $\alpha(\text{exp})$.
		112.6	29.1 5	0.0	5/2 ⁽⁻⁾	(E2)		1.189	$\alpha(\text{K})=0.828\ 12$; $\alpha(\text{L})=0.286\ 4$; $\alpha(\text{M})=0.0610\ 9$ $\alpha(\text{N})=0.01210\ 17$; $\alpha(\text{O})=0.001244\ 18$
482.6	13/2 ⁽⁻⁾	370.0	100	112.6	9/2 ⁽⁻⁾	E2		0.0217	$\alpha(\text{K})=0.0181\ 3$; $\alpha(\text{L})=0.00286\ 4$; $\alpha(\text{M})=0.000589\ 9$ $\alpha(\text{N})=0.0001200\ 17$; $\alpha(\text{O})=1.405\times 10^{-5}\ 20$
553.0	11/2 ⁽⁻⁾	440.4	100 4	112.6	9/2 ⁽⁻⁾	M1+E2	0.13	0.01524	$\alpha(\text{K})=0.01315\ 19$; $\alpha(\text{L})=0.001672\ 24$; $\alpha(\text{M})=0.000338\ 5$ $\alpha(\text{N})=7.01\times 10^{-5}\ 10$; $\alpha(\text{O})=8.79\times 10^{-6}\ 13$ E_γ : observed by 2000Ur04 but not by 2017Hu09.
998.4	17/2 ⁽⁻⁾	516.5 ^a 515.8	100	35.7 7/2 ⁽⁻⁾ 482.6 13/2 ⁽⁻⁾		E2		0.00824	$\alpha(\text{K})=0.00698\ 10$; $\alpha(\text{L})=0.001005\ 14$; $\alpha(\text{M})=0.000205\ 3$ $\alpha(\text{N})=4.21\times 10^{-5}\ 6$; $\alpha(\text{O})=5.05\times 10^{-6}\ 7$
1030.5	15/2 ⁽⁻⁾	477.5 547.9	63 4 100 4	553.0 11/2 ⁽⁻⁾ 482.6 13/2 ⁽⁻⁾		M1+E2	-0.15	0.00885	$\alpha(\text{K})=0.00765\ 11$; $\alpha(\text{L})=0.000965\ 14$; $\alpha(\text{M})=0.000195\ 3$ $\alpha(\text{N})=4.04\times 10^{-5}\ 6$; $\alpha(\text{O})=5.08\times 10^{-6}\ 8$
1156.2	(13/2 ⁺)	603.2	100 9	553.0 11/2 ⁽⁻⁾		(E1)		0.00193	$\alpha(\text{K})=0.001671\ 24$; $\alpha(\text{L})=0.000205\ 3$; $\alpha(\text{M})=4.14\times 10^{-5}\ 6$ $\alpha(\text{N})=8.54\times 10^{-6}\ 12$; $\alpha(\text{O})=1.064\times 10^{-6}\ 15$
1332.8	(15/2 ⁺)	673.6 850.2	74 4 100	482.6 13/2 ⁽⁻⁾ 482.6 13/2 ⁽⁻⁾					
1495.9	17/2 ⁽⁺⁾	339.7 465.4	100 9 95 5	1156.2 (13/2 ⁺) 1030.5 15/2 ⁽⁻⁾		(E1)		0.00348	$\alpha(\text{K})=0.00302\ 5$; $\alpha(\text{L})=0.000374\ 6$; $\alpha(\text{M})=7.54\times 10^{-5}\ 11$ $\alpha(\text{N})=1.555\times 10^{-5}\ 22$; $\alpha(\text{O})=1.93\times 10^{-6}\ 3$
1546.8	19/2 ⁽⁻⁾	497.5 516.3 548.4	14.3 18 18.4 20 100.0 20	998.4 17/2 ⁽⁻⁾ 1030.5 15/2 ⁽⁻⁾ 998.4 17/2 ⁽⁻⁾		M1+E2	0.19	0.00881	$\alpha(\text{K})=0.00761\ 11$; $\alpha(\text{L})=0.000961\ 14$; $\alpha(\text{M})=0.000194\ 3$ $\alpha(\text{N})=4.03\times 10^{-5}\ 6$; $\alpha(\text{O})=5.06\times 10^{-6}\ 7$
1671.1	19/2 ⁽⁺⁾	338.3	13 1	1332.8 (15/2 ⁺)					

Adopted Levels, Gammas (continued)

$\gamma(^{141}\text{Xe})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. #	$\alpha^@$	Comments
1671.1	19/2 ⁽⁺⁾	672.7	100.0 18	998.4	17/2 ⁽⁻⁾	(E1)	1.52×10 ⁻³	$\alpha(\text{K})=0.001318$ 19; $\alpha(\text{L})=0.0001613$ 23; $\alpha(\text{M})=3.25\times 10^{-5}$ 5 $\alpha(\text{N})=6.71\times 10^{-6}$ 10; $\alpha(\text{O})=8.37\times 10^{-7}$ 12
1680.2	21/2 ⁽⁻⁾	681.8		998.4	17/2 ⁽⁻⁾	E2	0.00396	$\alpha(\text{K})=0.00338$ 5; $\alpha(\text{L})=0.000459$ 7; $\alpha(\text{M})=9.34\times 10^{-5}$ 13 $\alpha(\text{N})=1.92\times 10^{-5}$ 3; $\alpha(\text{O})=2.35\times 10^{-6}$ 4
1974.7	(21/2 ⁺)	427.9	25.0 25	1546.8	19/2 ⁽⁻⁾			
		478.8	100 5	1495.9	17/2 ⁽⁺⁾			
1981.3	(21/2 ⁻)	301.1	100	1680.2	21/2 ⁽⁻⁾			
2135.0	23/2 ⁽⁺⁾	454.8	22.1 12	1680.2	21/2 ⁽⁻⁾			
		463.9	100.0 23	1671.1	19/2 ⁽⁺⁾	E2	0.01109	$\alpha(\text{K})=0.00936$ 14; $\alpha(\text{L})=0.001385$ 20; $\alpha(\text{M})=0.000284$ 4 $\alpha(\text{N})=5.80\times 10^{-5}$ 9; $\alpha(\text{O})=6.92\times 10^{-6}$ 10
2153.8	(23/2 ⁻)	473.6	100 4	1680.2	21/2 ⁽⁻⁾			
		607.0	78 4	1546.8	19/2 ⁽⁻⁾			
2397.9	(25/2 ⁻)	717.7	100	1680.2	21/2 ⁽⁻⁾			
2546.9	(25/2 ⁻)	149.0	50 17	2397.9	(25/2 ⁻)			
		565.6	100 8	1981.3	(21/2 ⁻)			
		866.7	92 8	1680.2	21/2 ⁽⁻⁾			
2577.1	(25/2 ⁺)	423.3	<20	2153.8	(23/2 ⁻)			
		602.4	100 8	1974.7	(21/2 ⁺)			
2697.0	(27/2 ⁺)	299.1 ^a	<2	2397.9	(25/2 ⁻)			
		562.0	100 2	2135.0	23/2 ⁽⁺⁾			
2847.4	(27/2 ⁻)	693.6	100	2153.8	(23/2 ⁻)			
3107.6	(29/2 ⁻)	709.7	100	2397.9	(25/2 ⁻)			
3146.4	(29/2 ⁺)	569.3	100	2577.1	(25/2 ⁺)			
3365.6	(31/2 ⁺)	668.6	100	2697.0	(27/2 ⁺)			
3925.7	(33/2 ⁻)	818.1	100	3107.6	(29/2 ⁻)			
4081.1	(35/2 ⁺)	715.5	100	3365.6	(31/2 ⁺)			

[†] From ²⁵²Cf SF decay dataset. None of the measurements done in ²⁵²Cf SF decay (2017Hu09) or ²⁴⁸Cm SF decay (2000Ur04 and 1996Be06) report uncertainties for E_γ values which however are consistent with one another (the energies of a same γ -ray fluctuate typically by less than 0.5 keV). The largest and most recent set of E_γ values was adopted here unless otherwise noted.

[‡] From ²⁵²Cf SF decay dataset (2017Hu09).

From $\gamma\gamma(\theta)$ in ²⁴⁸Cm SF decay and ²⁵²Cf SF decay datasets, and linear pol in ²⁴⁸Cm SF decay dataset, unless specified otherwise in comments.

@ Additional information 2.

& Additional information 3.

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

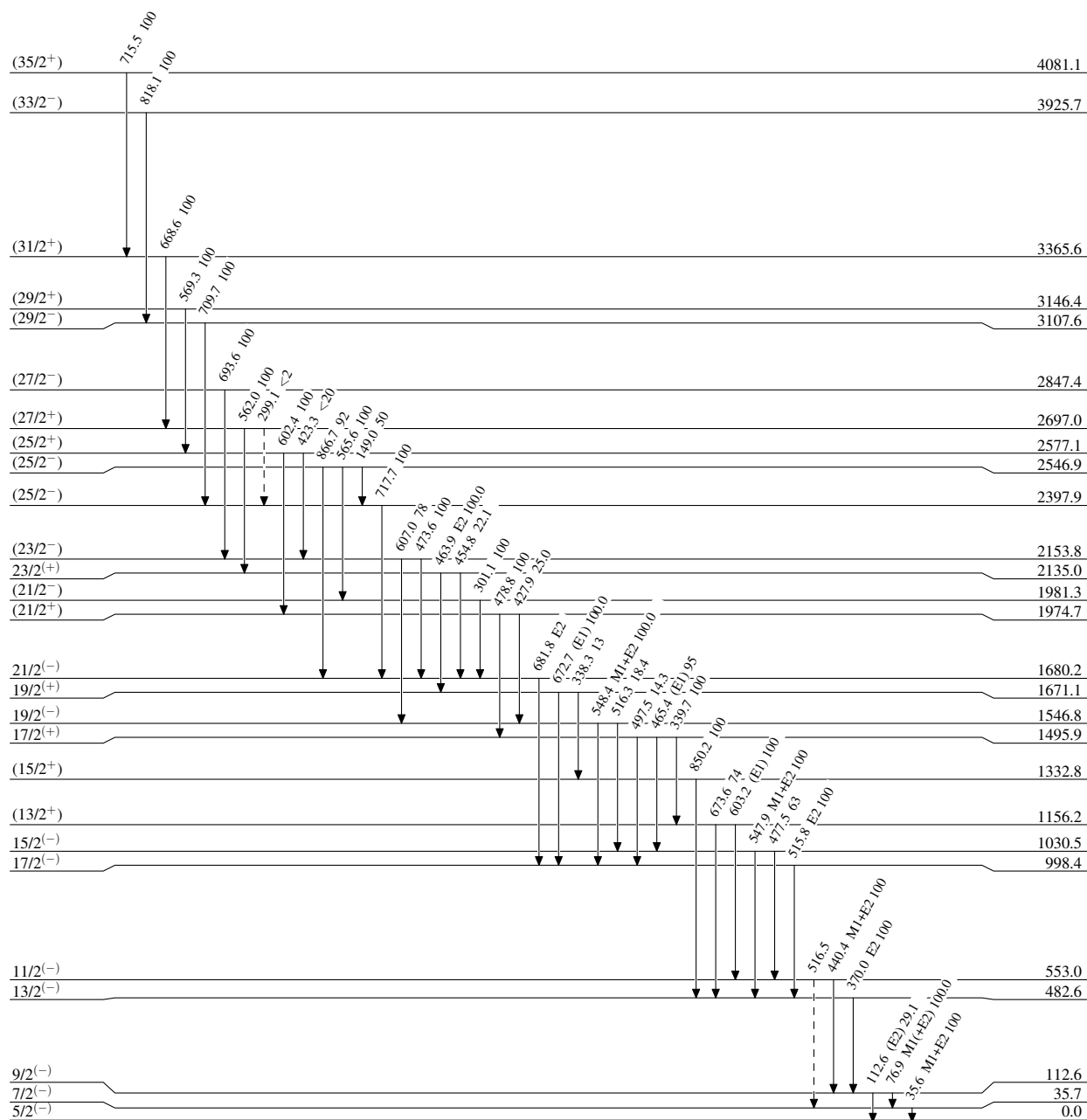
Adopted Levels, Gammas

Legend

Level Scheme

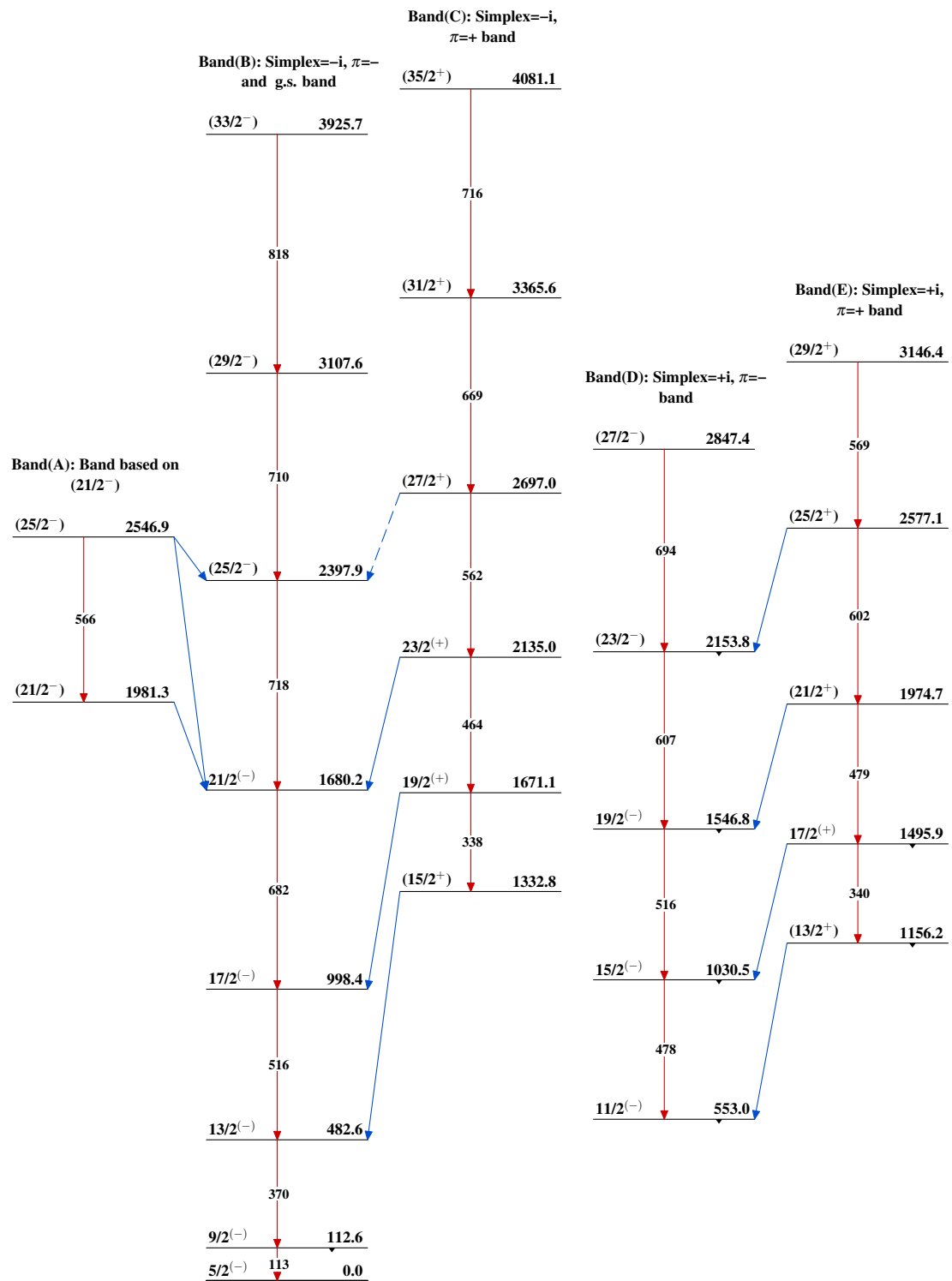
Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



1.73 s 1

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

Adopted Levels, Gammas $^{141}_{54}\text{Xe}_{87}$