

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Q(β^-)=7992 7; S(n)=3695 10; S(p)=9965 6; Q(α)=-384 6 2017Wa10
 S(2n)=8577 15, S(2p)=22051 8, Q(β^- n)=2332 6, Q(2 β^+)=10907 11 (2017Wa10).
 First identification of ¹³⁸I nuclide by 1949Su14 via neutron-induced fission (see 2013Ka01).
 2011Ba33: ²³⁹Pu(n,F) E=thermal, measured E γ , I γ . Deduced fission yields.
 2010MaZS: measured E γ , I γ , E(n), I(n). Deduced β -delayed neutron decay probability.
 2006Ro26: ²³⁵U, ²³⁹Pu(n,F) E=thermal-1.2 MeV. Measured cumulative yields.
 2002Is13: ²³⁵U(n,F) E=thermal. Measured delayed neutron yields.
 2000Lh02: ²³⁸U(n,F) E=20 MeV and ²³⁸U(p,F) E=25 MeV. Measured yields.
 2006KeZZ: ¹³⁸Te β^- decay, measured parent T_{1/2}.
 Mass measurement: 2012Va02.
 Other measurements: 2010MaZR, 1983En05, 1980De03, 1979Bo26, 1978Kr15, 1977Ru10, 1976Lu02, 1974Gr29, 1974Kr21, 1973Ad04, 1972Sc48, 1971Kr22.
 Nuclear structure calculations:
 2009Co21, 2007Ma09, 2006Ka46: calculated half-life.
 1982Ma02: calculated T_{1/2}, average E β , E γ , β -delayed En, delayed-neutron emission probability.
 Other calculations: 1982Ru01, 1978Gj01, 1978Gj02.

¹³⁸I Levels

Cross Reference (XREF) Flags

A ²⁴⁸Cm SF decay

E(level) [†]	J π^{\ddagger}	T _{1/2}	XREF	Comments
0.0	(1 ⁻)	6.26 s 3	A	% β^- =100; % β^- n=5.44 20 J π : from direct β feeding to 0 ⁺ and 2 ⁺ levels in ¹³⁸ Xe and shell-model calculations (2007Rz01). T _{1/2} : weighted average of 6.23 s 3 (1993Ru01), 6.46 s 15 (1976Lu02), 6.5 s 2 (1975As04), 6.33 s 8 (1975Kr17,1971Kr22), 6.40 s 17 (1974NoZR), 6.21 s 20 (1974Kr21), 6.30 s 29 (1970WiZN). Others: 6.62 s 9 (1974Gr29), 6.9 s 24 (1970Lu05), 6.3 s 7 (1959Pe28), 5.6 s 1 and 6.5 s 4 (1949Su14). % β^- n: weighted average of 5.32 20 (2011Go37), 5.56 22 (1993Ru01), 5.5 4 (1980Lu04), 5.1 30 (1980ReZQ). Others: 5.3 2 (1979RuZQ, compilation), \approx 5.4 (2010MaZS), 2.58 22 (1975As04), 4.5 9 (1974Kr21,corrected), 4.5 10 (1972Sc48,corrected). Configuration= $\pi g_{7/2} \otimes \nu f_{7/2}$ (2007Rz01). Theoretical T _{1/2} =11.5 s, % β^- n=2.4 (2003Mo09). %IT=100 T _{1/2} : from γ (t) (2007Rz01).
67.9? 3	(3 ⁻)	1.26 μ s 16	A	
186.2 5	(4 ⁻)		A	
222.3 4	(4 ⁻)		A	
229.2 4	(5 ⁻)		A	
297.4 5	(6 ⁻)		A	
362.9 [#] 6	(7 ⁻)		A	
722.9 [#] 6	(8 ⁻)		A	
994.1 [#] 6	(9 ⁻)		A	
1303.7 [#] 6	(10 ⁻)		A	
1577.3 [#] 6	(11 ⁻)		A	
1828.6 [#] 7	(12 ⁻)		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

¹³⁸I Levels (continued)

† From a least-squares fit to γ -ray energies, assuming an uncertainty of 0.3 keV for each γ ray.

‡ From 2007Rz01, based on deduced γ -ray multiplicities and band structure, unless otherwise noted.

Band(A): $\Delta J=1, \pi g_{7/2} \otimes \nu f_{7/2}$.

E _i (level)	J _i ^π	$\gamma(^{138}\text{I})$		E _f	J _f ^π	Mult.‡	$\alpha^{\text{@}}$	Comments
		E _{γ} †	I _{γ} †					
67.9?	(3 ⁻)	67.9&		0.0	(1 ⁻)	E2	7.00	$\alpha(\text{K})=3.80\ 6; \alpha(\text{L})=2.55\ 4; \alpha(\text{M})=0.544\ 8$ $\alpha(\text{N})=0.1041\ 15; \alpha(\text{O})=0.00931\ 13$ B(E2)(W.u.)=0.92 +20-16 Mult.: from K/L=1.56 20 (2007Rz01).
186.2	(4 ⁻)	118.3	100	67.9?	(3 ⁻)			
222.3	(4 ⁻)	154.6	100	67.9?	(3 ⁻)			
229.2	(5 ⁻)	43.5&	71 36	186.2	(4 ⁻)			
		161.1	100 29	67.9?	(3 ⁻)			
297.4	(6 ⁻)	68.2	100	229.2	(5 ⁻)	M1+E2	4.6 24	$\alpha(\text{K})=2.8\ 10; \alpha(\text{L})=1.4\ 12; \alpha(\text{M})=0.29\ 24$ $\alpha(\text{N})=0.06\ 5; \alpha(\text{O})=0.005\ 4$ Mult.: from $\alpha_{\text{K}}(\text{exp})=6\ 1$ (2007Rz01).
362.9	(7 ⁻)	65.6	100	297.4	(6 ⁻)	M1+E2	5 3	$\alpha(\text{K})=3.2\ 10; \alpha(\text{L})=1.6\ 14; \alpha(\text{M})=0.3\ 3$ $\alpha(\text{N})=0.07\ 6; \alpha(\text{O})=0.006\ 5$ Mult.: from $\alpha_{\text{K}}(\text{exp})=6.5\ 15$ (2007Rz01).
722.9	(8 ⁻)	360.1	100 13	362.9	(7 ⁻)	(M1+E2)		
		425.5	62 10	297.4	(6 ⁻)	(E2)#	0.01362	$\alpha(\text{K})=0.01149\ 16; \alpha(\text{L})=0.001706\ 24;$ $\alpha(\text{M})=0.000347\ 5$ $\alpha(\text{N})=6.92 \times 10^{-5}\ 10; \alpha(\text{O})=7.67 \times 10^{-6}\ 11$
994.1	(9 ⁻)	271.4	38 8	722.9	(8 ⁻)	(M1+E2)		
		631.1	100 14	362.9	(7 ⁻)	(E2)		
1303.7	(10 ⁻)	309.4	44 11	994.1	(9 ⁻)	(M1+E2)		
		580.6	100 17	722.9	(8 ⁻)	(E2)#	0.00569	$\alpha(\text{K})=0.00486\ 7; \alpha(\text{L})=0.000670\ 10;$ $\alpha(\text{M})=0.0001354\ 19$ $\alpha(\text{N})=2.72 \times 10^{-5}\ 4; \alpha(\text{O})=3.08 \times 10^{-6}\ 5$
1577.3	(11 ⁻)	273.7	24 6	1303.7	(10 ⁻)	(M1+E2)#	0.051 4	$\alpha(\text{K})=0.0427\ 20; \alpha(\text{L})=0.0065\ 13; \alpha(\text{M})=0.0013\ 3$ $\alpha(\text{N})=0.00026\ 5; \alpha(\text{O})=2.9 \times 10^{-5}\ 5$
		583.6	100 18	994.1	(9 ⁻)	(E2)		
1828.6	(12 ⁻)	251.8	100	1577.3	(11 ⁻)	(M1+E2)		
		524.5	12 3	1303.7	(10 ⁻)	(E2)#	0.00750	$\alpha(\text{K})=0.00638\ 9; \alpha(\text{L})=0.000898\ 13;$ $\alpha(\text{M})=0.000182\ 3$ $\alpha(\text{N})=3.64 \times 10^{-5}\ 6; \alpha(\text{O})=4.10 \times 10^{-6}\ 6$

† From 2007Rz01 in ²⁴⁸Cm SF decay.

‡ From 2007Rz01 based on band assignments and $\gamma\gamma(\theta)$ data, which are consistent with $\Delta J=1$ (Mult.=M1+E2) or $\Delta J=2$ (Mult.=E2), with brackets added by evaluator, unless otherwise noted.

Proposed by 2007Rz01 with brackets added by evaluator. No experimental evidence is provided in 2007Rz01 for these assignments.

@ Additional information 1.

& Placement of transition in the level scheme is uncertain.

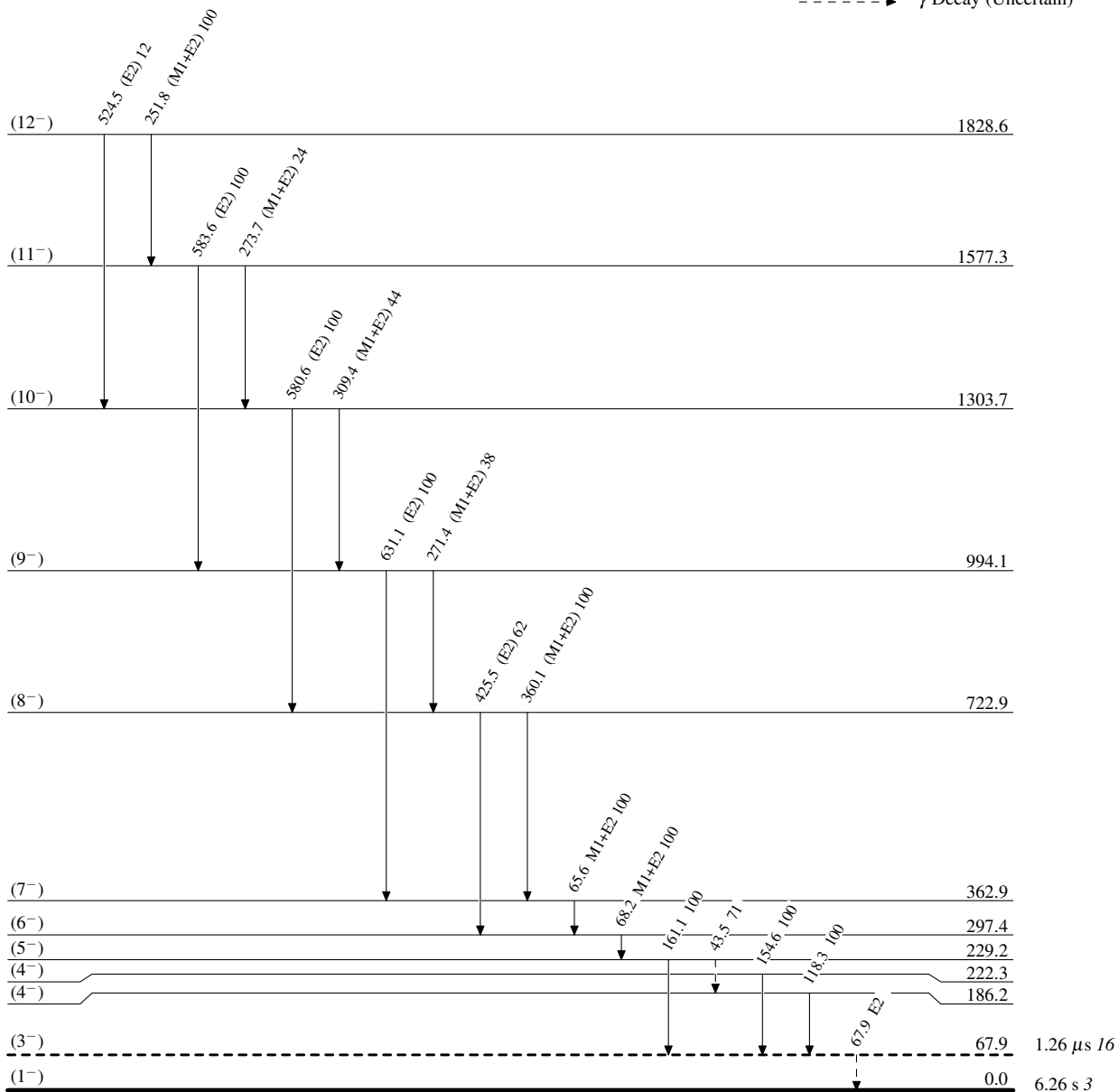
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

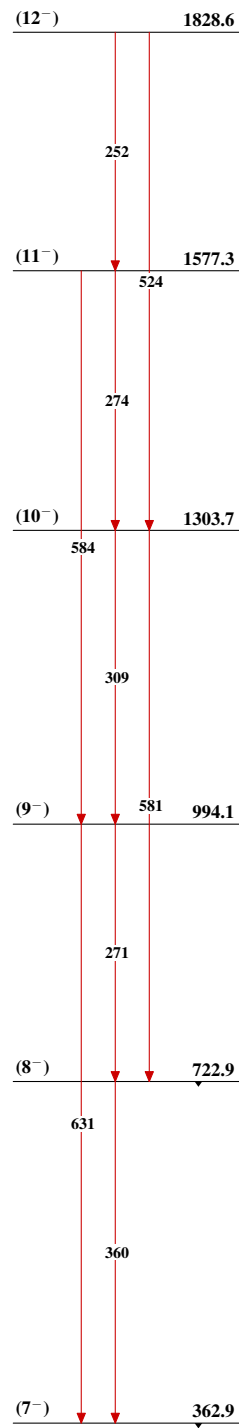
-----▶ γ Decay (Uncertain)



$^{138}_{53}\text{I}$

1.26 μ s 16

6.26 s 3

Adopted Levels, GammasBand(A): $\Delta J=1, \pi g_{7/2} \otimes \nu f_{7/2}$  $^{138}_{53}\text{I}_{85}$