Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Q(β^-)=−11070 *SY*; S(n)=13020 *SY*; S(p)=−609 *10*; Q(α)=3090 *SY* 2017Wa10
Q(εp)=6060 *140* (2017Wa10,syst).
The uncertainties associated with these systematic values are $\Delta Q(\beta^-)$=340, ΔS_n=250, and ΔQ_α=360 (2017Wa10).

^{153}Lu Levels

Cross Reference (XREF) Flags

- A ^{153}Lu IT decay (15 μs)
- B ^{157}Ta α decay (10.1 ms)
- C ^{157}Ta α decay (4.3 ms)
- D ^{157}Ta α decay (1.7 ms)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0[#]	11/2$^-$	0.9 s *2*	A CD	%α=?; %ε+%β^+=? J$^\pi$: Assigned $h_{11/2}$ from α decay pattern (1997Ir01). $T_{1/2}$: From ^{153}Lu ε decay (1989Ni04). %α,%ε+%β^+: The half-life estimated from gross β-decay theory is ≈ 3 s (1973Ta30), suggesting that ≈ 70% of the decays are from α decay and ≈ 30% from the ε+β^+ decay. However the recalculated partial $T_{1/2}$(%ε+%β^+) ≈ 0.5 s (2019Mo01) < 0.9 s for the total $T_{1/2}$ of g.s. makes the estimates of %ε+%β^+ and %α unphysical. The proton-separation energy is derived by 1997Da07 and they support the observation that this decay mode is very weak.
80 *5*	1/2$^+$		B	J$^\pi$: Assigned $s_{1/2}$ from α decay pattern (1997Ir01).
1432.07[#] *23*	(15/2$^-$)		A	
1606.14 *23*	(15/2$^+$)		A	Configuration=π $h_{11/2}\otimes 3^-$.
1822.7 *3*	(19/2$^+$)		A	Configuration=π $h_{11/2}\otimes 5^-$.
2147.0[#] *3*	(19/2$^-$)		A	
2211.6 *4*	(23/2$^+$)		A	Configuration=π $h_{11/2}\otimes 7^-$.
2481.6[#] *4*	(21/2$^-$)		A	
2502.5[#] *4*	(23/2$^-$)	>0.1 μs	A	
2632.9[#] *5*	(27/2$^-$)	15 μs *3*	A	

[†] From least-squares fits to γ-ray energies except for the 80-keV level.
[‡] Based primarily of systematics and IT decay scheme; other arguments are noted.
[#] Band(A): configuration=(π,$h^7_{11/2}$).

γ(^{153}Lu)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f
1432.07	(15/2$^-$)	1432.1 *3*	100 *9*	0.0	11/2$^-$
1606.14	(15/2$^+$)	174.0 *2*	100 *9*	1432.07	(15/2$^-$)
		1606.1 *3*	≈4	0.0	11/2$^-$
1822.7	(19/2$^+$)	216.5 *2*	100	1606.14	(15/2$^+$)
2147.0	(19/2$^-$)	323.9 *3*	29 *6*	1822.7	(19/2$^+$)
		715.1 *3*	100 *11*	1432.07	(15/2$^-$)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{153}Lu)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	α[‡]	$I_{(\gamma+ce)}$	Comments
2211.6	$(23/2^+)$	389.1 *3*	100	1822.7	$(19/2^+)$				
2481.6	$(21/2^-)$	270.0 *2*	100 *8*	2211.6	$(23/2^+)$				
		658.8 *3*	92 *8*	1822.7	$(19/2^+)$				
2502.5	$(23/2^-)$	(21)		2481.6	$(21/2^-)$			88	E_γ: Unobserved, but required by $\gamma\gamma$ coincidences. $I_{(\gamma+ce)}$: From intensity balances at 2502 and 2481 levels in ^{153}Lu IT decay.
		291.0 *3*	14 *4*	2211.6	$(23/2^+)$	[E1]	0.0222		α(K)=0.0187 *3*; α(L)=0.00279 *4*; α(M)=0.000623 *9* α(N)=0.0001458 *21*; α(O)=2.09×10^{-5} *3*; α(P)=1.151×10^{-6} *17* B(E1)(W.u.)<8.5×10^{-9}
		355.4 *3*	100 *7*	2147.0	$(19/2^-)$	[E2]	0.0466		α(K)=0.0342 *5*; α(L)=0.00950 *14*; α(M)=0.00225 *4* α(N)=0.000524 *8*; α(O)=6.98×10^{-5} *10*; α(P)=2.21×10^{-6} *4* B(E2)(W.u.)<0.01
2632.9	$(27/2^-)$	130.4 *2*	100	2502.5	$(23/2^-)$	E2	1.238		α(K)=0.531 *8*; α(L)=0.540 *9*; α(M)=0.1333 *21* α(N)=0.0307 *5*; α(O)=0.00376 *6*; α(P)=2.81×10^{-5} *4* B(E2)(W.u.)=0.0092 *+23−16*

[†] From intensity balance in ^{153}Lu IT decay.
[‡] Additional information 1.

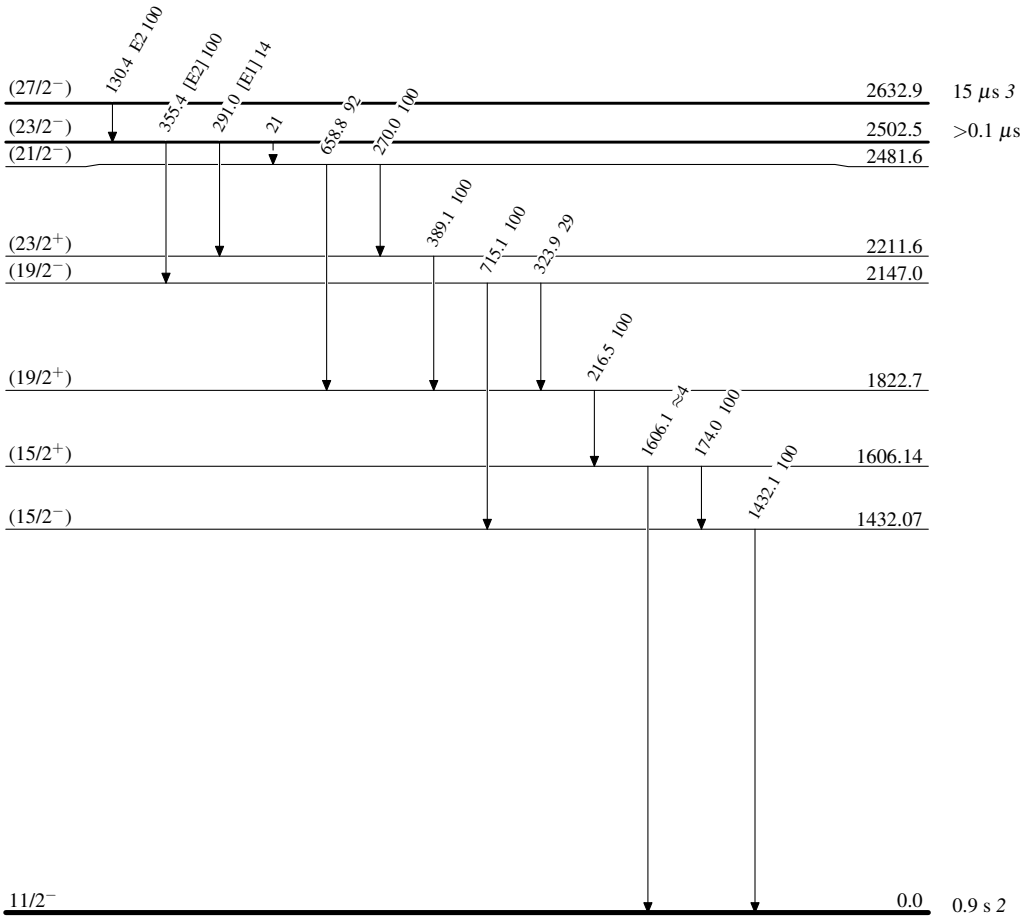
Adopted Levels, Gammas

Legend

Level Scheme

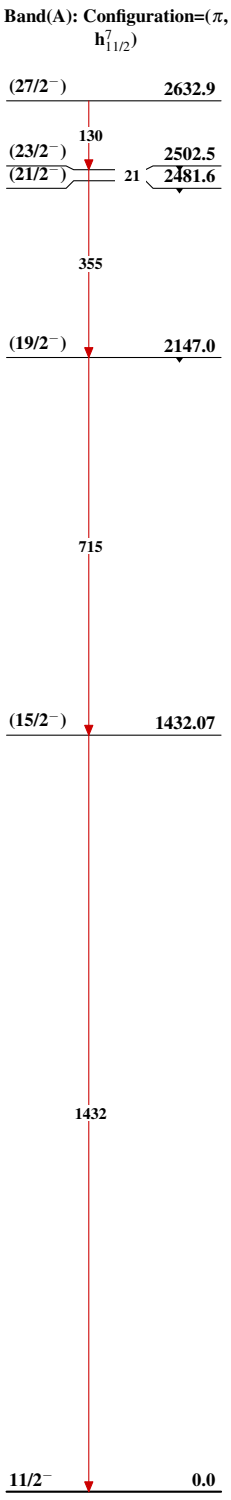
Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{153}_{71}Lu_{82}$

Adopted Levels, Gammas



$^{153}_{71}Lu_{82}$