Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 132, 1 (2016)	4-Dec-2015

Q(β^-)=−10123 (syst) *427*; S(n)=11803 (syst) *334*; S(p)=−935 *10*; Q(α)=6355 *6* 2017Wa10
Q(ε)=9310 (syst) *247*; S(2n)=21808 (syst) *334*; S(2p)=1.63×10^3 *10*; Q(εp)=6.82×10^3 *14* 2017Wa10
Additional information 1.
This data set has been prepared, in part, from the evaluation of the proton radioactivity (2002So02) which populates ^{156}Hf. This nuclide has been produced by ^{102}Pd(^{58}Ni,p2n) with E(^{58}Ni) = 270 MeV in recoil mass separator with PPAC/DSSD detectors at focal plane (1997Ir01) and same reaction and measurements with E(^{58}Ni) = 290 MeV (1996Pa01).
Theoretical works related to the nuclear shape and the separation or decay energies are:
2001Go20: β_2=0.00, β_4=0.00, S(p)=−0.5 MeV.
1997Mo25: S(p)=−0.48 MeV, S(2p)=1.76 MeV, Q(α)=6.20 MeV, $T_{1/2}(\beta)$=0.5664 s, $T_{1/2}(\alpha)$=2.570 ms.
1995Mo29: β_2=0.045, β_4=0.001, β_6=0.000.
1995Ab38: β_2=0.12, β_4=0.01, S(p)=−0.8 MeV.
1976Li30: S(p)=−0.79 MeV, Q(α)=5.97 MeV.

^{157}Ta Levels

Cross Reference (XREF) Flags

A ^{161}Re α decay (14.7 ms)
B ^{157}W ε decay
C ^{102}Pd(^{58}Ni,p2nγ)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
0.0	1/2$^+$	10.1 ms *4*	C	%p=3.4 *12*; %α=96.6 *12* %α: from 100−%p and assuming no significant ε+β+ decay (1997Ir01). For the proton decay to ^{156}Hf, E(p)=927 keV *7*, %p=3.4 *12*, J^π(p)=1/2$^+$, $T_{1/2}$(p)=0.30 s *11*, and configuration=$\pi(2s_{1/2})$ (1997Ir01). 1996Pa01 observe a single proton radioactivity event with E(p)=919 keV *17*, 11 ms after implantation of ^{157}Ta nuclei. $T_{1/2}$: from α(t) (1997Ir01); other 12.1 ms +*31*−*23* from p(t) (1997Ir01).
22‡ *5*	11/2$^-$	4.3 ms *1*	A C	%α=100 Additional information 2. Jπ: from feeding from 11/2$^-$ state in ^{161}Re and α feeding to 11/2$^-$ level in ^{153}Lu. %α: no proton radioactivity has been observed for this level and it is expected to be much slower than α decay due to the large value of proton angular momentum. Measured %α: 100 *23* (1979Ho10) and 95 *12* (1996Pa01). $T_{1/2}$: from α(t) (1996Pa01); other: 5.3 ms 18 (1979Ho10).
864.0‡ *3*	15/2$^{(-)}$		C	Jπ: stretched ΔJ=2 γ to 11/2$^-$.
1567.2‡ *5*	19/2$^{(-)}$		C	Jπ: stretched ΔJ=2 γ to 15/2$^{(-)}$.
1589? *10*	(25/2$^-$)	1.7 ms *1*		%α=100 E(level): it is assumed that an observed α decay feeds the ground state of ^{153}Lu (1996Pa01). Jπ: from similarities with other high-spin isomers in ^{155}Lu and ^{156}Hf with configuration of $[\pi(h_{11/2})\ \nu(f_{7/2}\ h_{9/2})]_{25/2-}$ (1996Pa01). $T_{1/2}$: from α(t) (1996Pa01).
1717.8# *6*	(23/2$^-$)	≈5 ns	C	Jπ: level does not follow trend for calculated 23/2$^-$ states associated with $\pi h_{11/2}\otimes(\nu f_{7/2})^2$ configuration. It is most likely the 23/2$^-$ member of the $\pi h_{11/2}\otimes\nu f_{7/2}h_{9/2}$ multiplet. $T_{1/2}$: the interval 1-10 ns is deduced based on the favored E2 multipolarity of the 151γ and intensity arguments of this and lower gamma rays; ≈ 5 ns is finally adopted (2005Se11).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{157}Ta Levels (continued)

E(level)[†]	J^π	XREF	Comments
2360.4[#] *6*	$(27/2^-)$	C	J^π: assignment based on systematics as angular distribution ratio for 643 transition is ambiguous.
2927.7[@] *7*	$(29/2^+)$	C	J^π: assignment based on systematics as angular distribution ratio for 567 transition is ambiguous.
3065.4[@] *8*	$(31/2^+)$	C	J^π: assignment based on likely M1 γ to $(29/2^+)$.
3353.9[@] *8*		C	
3678.1 *9*		C	
3986.9[@] *9*		C	

[†] From least-squares fit to Eγ's (for levels higher than 22 keV); ΔE_γ=0.3 keV.
[‡] Band(A): $\pi h_{11/2}\otimes(\nu f_{7/2})^2$.
[#] Band(B): $\pi h_{11/2}\otimes\nu f_{7/2}h_{9/2}$ multiplet.
[@] Band(C): $\pi h_{11/2}\otimes[(\nu f_{7/2})^2\otimes 3^- + \nu f_{7/2}i_{13/2}]$.

$\gamma(^{157}Ta)$

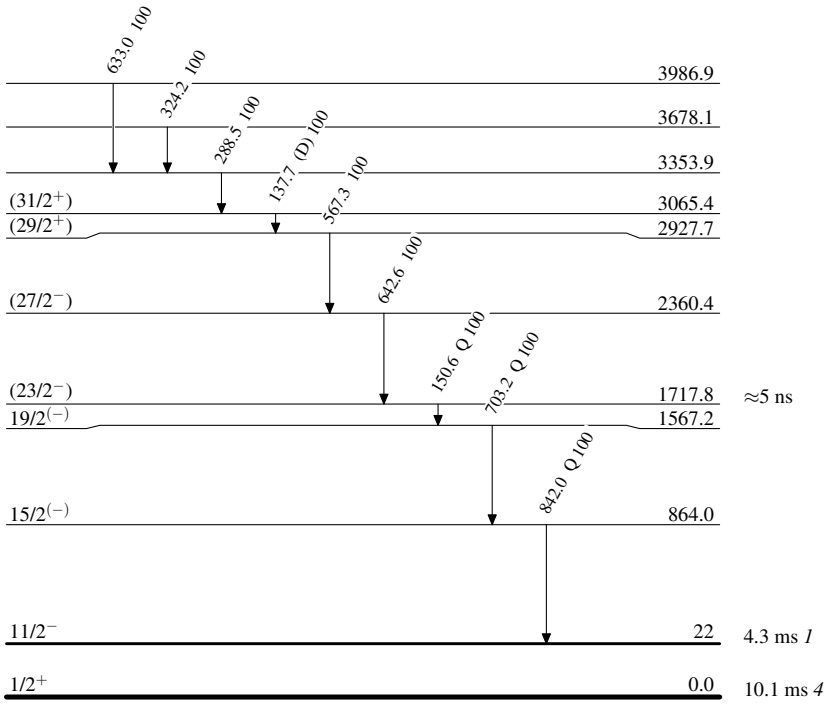
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	Comments
864.0	$15/2^{(-)}$	842.0	100	22	$11/2^-$	Q	Mult.: stretched $\Delta J=2$ based on angular distribution ratio.
1567.2	$19/2^{(-)}$	703.2	100	864.0	$15/2^{(-)}$	Q	Mult.: stretched $\Delta J=2$ based on angular distribution ratio.
1717.8	$(23/2^-)$	150.6	100	1567.2	$19/2^{(-)}$	Q	Mult.: E2 multipolarity favoured for this transition, based upon single-particle Weiskopff estimates. Assignment further supported by intensity balance arguments.
2360.4	$(27/2^-)$	642.6	100	1717.8	$(23/2^-)$		
2927.7	$(29/2^+)$	567.3	100	2360.4	$(27/2^-)$		
3065.4	$(31/2^+)$	137.7	100	2927.7	$(29/2^+)$	(D)	Mult.: likely to be M1 from angular distribution ratio.
3353.9		288.5	100	3065.4	$(31/2^+)$		
3678.1		324.2	100	3353.9			
3986.9		633.0	100	3353.9			

[†] From angular distribution measurements (^{102}Pd(^{58}Ni,p2nγ), 2005Se11).

Adopted Levels, Gammas

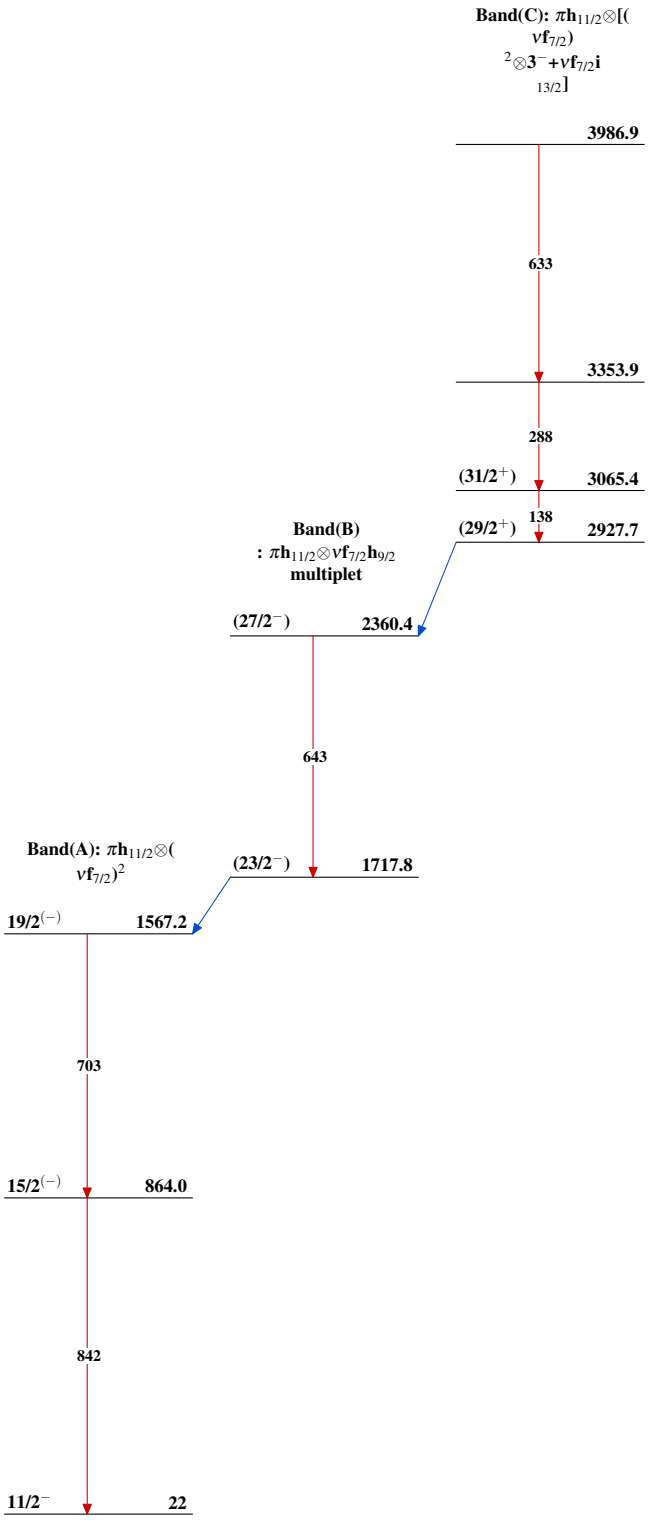
Level Scheme

Intensities: Relative photon branching from each level



$^{157}_{73}Ta_{84}$

Adopted Levels, Gammas



$^{157}_{73}Ta_{84}$