Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 160, 1 (2019)	21-Oct-2019

Q(β^-)=−8375 (syst) *299*; S(n)=10901 (syst) *197*; S(p)=−98 *8*; Q(α)=5803 *3* 2017Wa10
Q(ε)=7.96×10^3 *3*; S(2n)=2.031×10$^{4(syst)}$ *197*; S(2p)=3150 *8*; Q(εp)=4593 *16* 2017Wa10
The two heavy-ion induced reaction dataset are in relatively good agreement. Adopted here are the data from the newer ^{102}Pd(^{58}Ni,p$\alpha\gamma$) dataset that present a more detailed level scheme.
Unless noted otherwise all data are from ^{102}Pd(^{58}Ni,p$\alpha\gamma$) dataset (2016Ca42).

^{155}Lu Levels

Cross Reference (XREF) Flags

- A ^{159}Ta α decay (518 ms)
- B ^{159}Ta α decay (1.04 s)
- C ^{102}Pd(^{58}Ni,3p2nγ)
- D ^{102}Pd(^{58}Ni,p$\alpha\gamma$)

E(level)	J$^\pi$[†]	T$_{1/2}$	XREF	Comments
0.0[‡]	11/2$^-$	68 ms *2*	BCD	%α=90 *2*; %ε+%β^+=10 *2* %α: Weighted average of 81 *9* (1996Pa01) and 90 *2* (1997Da07). This is the same as that reported by 1997Da07. Other: 79 *4* (1979Ho10). Eα to g.s. of ^{151}Tm: 5651.3 *21*, weighted average of: 5655 *5* (2018Pa37), 5655 *5* (1996Pa01), 5648 *5* (1993Li34), 5648 *5* (1991To08), 5647 *5* (1989Ho12), 5656 *6* (1981HoZM). Unc for 2018Pa37 was assigned by evalutor. One can see that 2018Pa37 and 1996Pa01 give identical values and 2018Pa37 show no evidence of real measurement for this branch, whence the possibility that they quoted this value from 1996Pa01, although on Fig. 1 of 2018Pa37 showing the α decay scheme of both ^{155}Lu (11/2$^-$) g.s. and (25/2$^-$) isomer they state that they show their measured figures. If one excludes 5655 *5* of 2018Pa37 from weighted avarage one gets 5650.5 *23* which by rounding off gives the same value as the one including it. Also 2018Pa37 and 1996Pa01 are done by different groups although the first author is the same. Same first authorship with different groups characterizes 1989Ho12 and 1981HoZM, reason for which the results of both references were included in the weighted average. T$_{1/2}$: weighted average of: 67 ms *7* (1991To08); 70 ms *6* (1979Ho10); 70 ms *2* (1996Pa01); 63 ms *2* (1997Da07); and 70 ms *6* (1989Ho12). 1991To09, from the same group as 1991To08, report T$_{1/2}$=66 ms *7*. 1996Pa01 actually report an uncertainty of 1 ms for their value, but the evaluator has increased it to 2 ms so that it will contribute no more than 50% to the weighted average. J$^\pi$: member of a sequence, headed by ^{167}Ir, of favored α transitions connecting π h$_{11/2}$ states (1997Da07). configuration: $\pi h_{11/2}\otimes(\nu f_{7/2})^2_{0^+}$.
20 *6*	1/2$^+$	138 ms *9*	A D	%α=76 *16*; %ε+%β^+=24 *16* Additional information 1. %α: From 1997Da07. E(level): from the energy differences of the relevant α transitions in the α decay chain headed by ^{167}Ir (1997Da07). 1996Pa01 report 71 keV *3* for this level energy. J$^\pi$: member of a sequence, headed by ^{167}Ir, of favored α transitions connecting π s$_{1/2}$ states (1997Da07). T$_{1/2}$: weighted average of: 140 ms *20* (1991To09); 136 ms *9* (1996Pa01); and 150 ms *24* (1997Da07).
806.70[‡] *20*	(15/2$^-$)		CD	configuration: $\pi h_{11/2}\otimes(\nu f_{7/2})^2_{2^+}$.

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Adopted Levels, Gammas (continued)

^{155}Lu Levels (continued)

E(level)	J^{π}[†]	$T_{1/2}$	XREF	Comments
1491.5[‡] *3*	(19/2$^-$)		CD	configuration: $\pi h_{11/2}\otimes(\nu f_{7/2})^2_{4^+}$.
1780[#] *4*	(25/2$^-$)	2.69 ms *3*	CD	%α=99.964 *6* (2018Pa37) Additional information 2. %α: from the presently established level scheme of ^{155}Lu, γ emission can take place only via E4 and/or M3 transitions. α emission becomes the most probable decay mode, confirmed by 2018Pa37 result here adopted. J^{π}: from the systematics of the level structure of the near-lying odd-mass N=84 nuclides (see 2001Di17, 2016Ca42) and references therein). Eα to g.s. of ^{151}Tm: 7385.7 *34*, weighted average of: 7383 *4* (2018Pa37) and 7390 *5* (1996Pa01). Others: 7379 *15* (1993Li34), 7408 *10* (1981HoZM). E(level): calculated from the difference of the energies of the α transitions from this level and from the ^{155}Lu g.s. (J^{π}=11/2$^-$): 7385.7 *34* − 5651.3 *21* = 1734.4 *40* (corrected for the recoil loss). $T_{1/2}$: weighted average of 2.71 ms *3* (1996Pa01) and 2.60 ms *7* (1989Ho12). Other: 2.7 ms *3* (1979Ho10). configuration: $(\pi h_{11/2})^3\otimes\nu f_{7/2}h_{9/2}$, with $[\pi h_{11/2},\nu h_{9/2}]_{1^+}$.
1820.2[‡] *5*	(23/2$^-$)		CD	configuration: $\pi h_{11/2}\otimes(\nu f_{7/2})^2_{6^+}$.
2298.50[#] *20*	(27/2$^-$)		CD	Proposed as the fully aligned configuration. configuration: $\pi h_{11/2}\otimes\nu f_{7/2}h_{9/2}$.
2958.2[#] *3*	(29/2$^+$)		CD	configuration: $\pi h_{11/2}\otimes\nu f_{7/2}i_{13/2}$.
3064.5[#] *3*	(31/2$^+$)		D	configuration: $\pi h_{11/2}\otimes\nu f_{7/2}i_{13/2}$.
3418.6 *4*			D	
3445.7 *4*			D	
3774.0 *4*			D	
3861.9 *4*	(35/2$^+$)		D	
4073.9 *4*	(37/2$^-$)		D	
4633.6 *5*			D	
4938.1 *6*			D	
5031.8 *5*			D	
5128.1 *6*			D	
5285.9 *6*			D	
5372.9 *5*			D	
5482.8 *6*			D	
5667.4 *6*			D	
6033.0 *6*			D	
6059.9?[@] *6*			D	
6265.3 *6*			D	
6436.9?[@]			D	
7095.9?[@]			D	

[†] Values from ^{102}Pd(^{58}Ni,p$\alpha\gamma$) dataset (2016Ca42) are adopted based solely on systematics of odd-A N=84 istones of ^{155}Lu and shell model calculations.

[‡] Band(A): Band based on (11/2$^-$) g.s.. Based on $\pi h_{11/2}\otimes(\nu f_{7/2})^2$ (2016Ca42). $\Delta E\gamma'$s not given in 2016Ca42 were adopted by evaluator in analogy with those given by authors for γ's in Table 1 "Energy and efficiency-corrected relative intensities".

[#] Seq.(B): Cascade based on the (25/2$^-$) isomer.

[@] Level marked as uncertain in Fig. 2 "Level Scheme" of 2016Ca42 ^{102}Pd(^{58}Ni,p$\alpha\gamma$) dataset presumably because the order of the γ rays in cascade is not certain.

Adopted Levels, Gammas (continued)

γ(^{155}Lu)

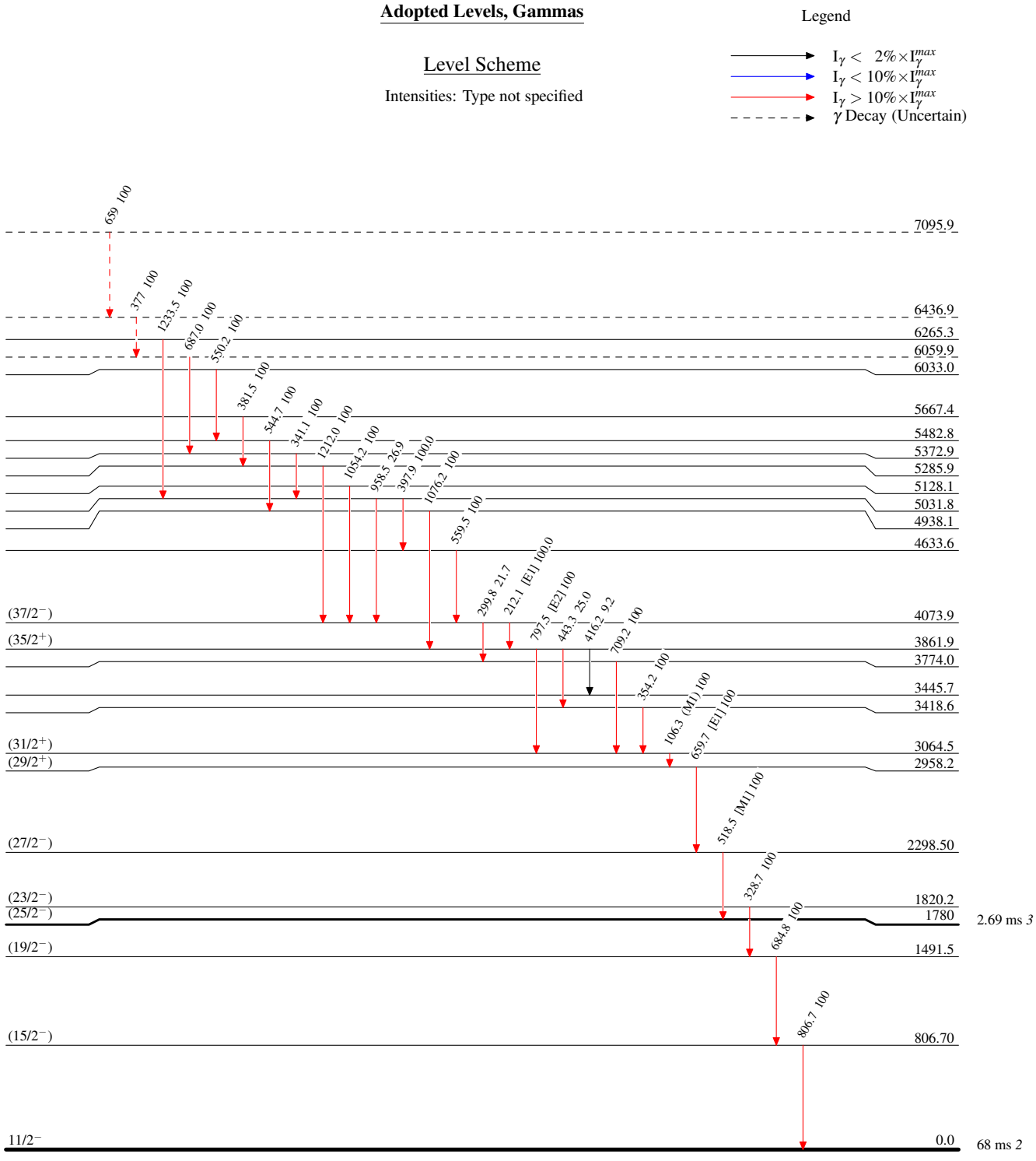
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α†	Comments
806.70	(15/2⁻)	806.7 *2*	100	0.0	11/2⁻			
1491.5	(19/2⁻)	684.8 *2*	100	806.70	(15/2⁻)			
1820.2	(23/2⁻)	328.7 *3*	100	1491.5	(19/2⁻)			
2298.50	(27/2⁻)	518.5 *2*	100	1780	(25/2⁻)	[M1]	0.0404	α(K)=0.0339 *5*; α(L)=0.00505 *7*; α(M)=0.001132 *16* α(N)=0.000267 *4*; α(O)=3.97×10^{-5} *6*; α(P)=2.49×10^{-6} *4*
2958.2	(29/2⁺)	659.7 *2*	100	2298.50	(27/2⁻)	[E1]	0.00351	α(K)=0.00297 *5*; α(L)=0.000420 *6*; α(M)=9.35×10^{-5} *14* α(N)=2.20×10^{-5} *3*; α(O)=3.23×10^{-6} *5*; α(P)=1.93×10^{-7} *3*
3064.5	(31/2⁺)	106.3 *1*	100	2958.2	(29/2⁺)	(M1)	3.09	α(K)=2.58 *4*; α(L)=0.398 *6*; α(M)=0.0895 *13* α(N)=0.0211 *3*; α(O)=0.00313 *5*; α(P)=0.000193 *3* Mult.: assumed by 2016Ca42 in ^{102}Pd(^{58}Ni,pαγ) dataset: D, due to higher lifetimes expected from higher mult′s, (M1) from better compatibilty with intensities of other transitions.
3418.6		354.2 *2*	100	3064.5	(31/2⁺)			
3774.0		709.2 *3*	100	3064.5	(31/2⁺)			
3861.9	(35/2⁺)	416.2 *2*	9.2 *5*	3445.7				
		443.3 *2*	25.0 *5*	3418.6				
		797.5 *3*	100 *1*	3064.5	(31/2⁺)	[E2]	0.00625	α(K)=0.00512 *8*; α(L)=0.000880 *13*; α(M)=0.000200 *3* α(N)=4.71×10^{-5} *7*; α(O)=6.74×10^{-6} *10*; α(P)=3.52×10^{-7} *5*
4073.9	(37/2⁻)	212.1 *2*	100.0 *6*	3861.9	(35/2⁺)	[E1]	0.0492	α(K)=0.0411 *6*; α(L)=0.00629 *9*; α(M)=0.001408 *20* α(N)=0.000329 *5*; α(O)=4.67×10^{-5} *7*; α(P)=2.45×10^{-6} *4*
		299.8 *2*	21.7 *4*	3774.0				
4633.6		559.5 *2*	100	4073.9	(37/2⁻)			
4938.1		1076.2 *4*	100	3861.9	(35/2⁺)			
5031.8		397.9 *2*	100.0 *12*	4633.6				
		958.5 *3*	26.9 *12*	4073.9	(37/2⁻)			
5128.1		1054.2 *4*	100	4073.9	(37/2⁻)			
5285.9		1212.0 *4*	100	4073.9	(37/2⁻)			
5372.9		341.1 *2*	100	5031.8				
5482.8		544.7 *2*	100	4938.1				
5667.4		381.5 *2*	100	5285.9				
6033.0		550.2 *2*	100	5482.8				
6059.9?		687.0 *3*	100	5372.9				
6265.3		1233.5 *4*	100 *3*	5031.8				
6436.9?		377‡	100	6059.9?				
7095.9?		659‡	100	6436.9?				

† Additional information 3.
‡ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

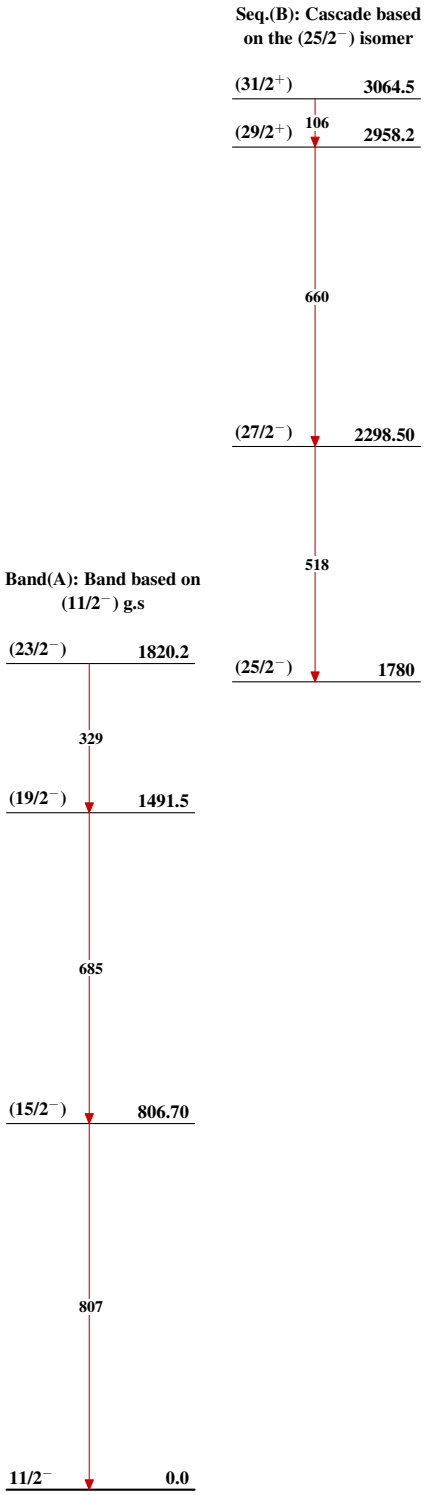
Level Scheme

Intensities: Type not specified



$^{155}_{71}Lu_{84}$

Adopted Levels, Gammas



$^{155}_{71}Lu_{84}$