

Adopted Levels, Gammas

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

$Q(\beta^-) = -7537$ (syst) 196; $S(n) = 1.081 \times 10^4$ 6; $S(p) = 464$ 12; $Q(\alpha) = 5108$ 3 2017Wa10
 $Q(\varepsilon) = 6981$ 14; $S(2n) = 20038$ 6; $S(2p) = 4393$ 12; $Q(\varepsilon p) = 3105$ 17 2017Wa10
 Additional information 1.

 ^{157}Lu Levels

Data for levels above the $11/2^-$ isomer are from $^{102}\text{Pd}(^{58}\text{Ni}, 3p\gamma)$ and those for the ground state and $11/2^-$ isomer are from ^{157}Lu α decays to ^{153}Tm . The ^{157}Lu ground state decays (1991Le15, 1991To09) to the $s_{1/2}$ excited level in ^{153}Tm and the ^{157}Lu excited level decays to the $h_{11/2}$ ground state of ^{153}Tm .

Cross Reference (XREF) Flags

A ^{161}Ta α decay
 B $^{102}\text{Pd}(^{58}\text{Ni}, 3p\gamma)$

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0.0	(1/2 ⁺ , 3/2 ⁺)	6.8 s 18	AB	$\% \alpha > 0$ J^π : From assignment as $s_{1/2}$ or $d_{3/2}$ state. $T_{1/2}$: Weighted average of 5.7 s 5 (1991To09) and 9.6 s 8 (1991Le15, 1992Po14); values are very discrepant with the reduced- $\chi^2 = 17$.
20.9 [‡] 20	(11/2 ⁻)	4.79 s 12	AB	$\% \alpha = 6$ 2; $\% \varepsilon + \% \beta^+ = 94$ 2 $\% \alpha$: From $I_\alpha(\text{daughter})/I_\alpha(\text{parent})$ (1979Ho10). $E(\text{level})$: from 2012Au07 (same value adopted by 1992Po14); other values: 32 2 (1991Le15, 1992Ka55), 22 (1993To07), all calculated from $E(\alpha)$ values. J^π : From assignment as $h_{11/2}$ state. $T_{1/2}$: Weighted average of 5.5 s 3 (1979Be52), 5.0 s 5 (1983To01), 4.4 s 3 (1992Ha10), 4.8 s 2 (1991To09), and 4.74 s 11 (1991Le15). Others: 4.5 s 15 (1972GaZR) and 5.2 s 3 (1979BeYR). Additional information 2.
558.09 [‡] 10	(15/2 ⁻)		B	
1163.92 [‡] 15	(19/2 ⁻)		B	
1796.72 [‡] 19	(23/2 ⁻)		B	
2128.61 [#] 21	(25/2 ⁻)		B	
2395.92 [‡] 21	(27/2 ⁻)		B	
2802.61 23	(29/2 ⁺)		B	
2877.2 [#] 4	(29/2 ⁻)		B	
2936.51 [@] 25	(31/2 ⁺)		B	
3107.6 [‡] 4	(31/2 ⁻)		B	
3487.7 ^{&} 3	(33/2 ⁺)		B	
3625.0 [#] 5	(33/2 ⁻)		B	
3644.3 3	(33/2 ⁺)		B	
3753.1 [@] 3	(35/2 ⁺)		B	
3824.6 [‡] 5	(35/2 ⁻)		B	
4222.4 ^{&} 3	(37/2 ⁺)		B	
4422.2 [@] 3	(39/2 ⁺)		B	
4555.2 [‡] 7			B	

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Adopted Levels, Gammas (continued) ^{157}Lu Levels (continued)

E(level) [†]	J ^π	XREF	E(level) [†]	J ^π	XREF	E(level) [†]	XREF
4717.1 ^{& 3}	(41/2 ⁺)	B	5322.9 4		B	6789.6 ^{a 5}	B
4845.1 4	(43/2 ⁺)	B	5426.9 4	(47/2 ⁺)	B	7090.2 ^{a 5}	B
4946.9 ^{@ 4}	(43/2 ⁺)	B	6089.5 ^{a 4}		B	8224.7 ^{a 7}	B
5107.1 ^{& 4}	(45/2 ⁺)	B	6175.8 6		B	8538.4 ^{a 8}	B
5115.5 4	(47/2 ⁺)	B	6184.6 5		B		

[†] The uncertainties given for the levels above 100 keV are for only the difference from the 20.9-keV level (for total uncertainties 2.0 keV are to added quadratically).

[‡] Band(A): 11/2⁻ band.

Band(B): band based on 25/2⁻ level.

@ Band(C): band based on 31/2⁺ level.

& Band(D): band based on 33/2⁺ level.

^a Band(E): γ cascade based on 6089.5 level.

 $\gamma(^{157}\text{Lu})$

E _i (level)	J _i ^π	E _γ	I _γ	E _f	J _f ^π	Mult.	α [†]	Comments
558.09	(15/2 ⁻)	537.19 10	100	20.9	(11/2 ⁻)	E2	0.01553	α(K)=0.01225 18; α(L)=0.00254 4; α(M)=0.000588 9 α(N)=0.0001376 20; α(O)=1.91×10 ⁻⁵ 3; α(P)=8.30×10 ⁻⁷ 12 A ₂ =+0.11 3.
1163.92	(19/2 ⁻)	605.83 10	100	558.09	(15/2 ⁻)	E2	0.01162	α(K)=0.00929 13; α(L)=0.00180 3; α(M)=0.000415 6 α(N)=9.73×10 ⁻⁵ 14; α(O)=1.365×10 ⁻⁵ 20; α(P)=6.34×10 ⁻⁷ 9 DCO=1.14 16.
1796.72	(23/2 ⁻)	632.80 12	100	1163.92	(19/2 ⁻)	E2	0.01049	α(K)=0.00843 12; α(L)=0.001599 23; α(M)=0.000368 6 α(N)=8.62×10 ⁻⁵ 12; α(O)=1.214×10 ⁻⁵ 17; α(P)=5.76×10 ⁻⁷ 8 DCO=1.19 18.
2128.61	(25/2 ⁻)	331.83 10	100	1796.72	(23/2 ⁻)	M1	0.1305	α(K)=0.1092 16; α(L)=0.01650 24; α(M)=0.00370 6 α(N)=0.000875 13; α(O)=0.0001299 19; α(P)=8.09×10 ⁻⁶ 12 DCO=0.59 14. A ₂ =-0.20 5.
2395.92	(27/2 ⁻)	267.23 12	70 5	2128.61	(25/2 ⁻)	M1	0.234	α(K)=0.196 3; α(L)=0.0297 5; α(M)=0.00667 10 α(N)=0.001577 23; α(O)=0.000234 4; α(P)=1.453×10 ⁻⁵ 21 DCO=0.65 16. A ₂ =-0.23 5.
		599.27 11	100 4	1796.72	(23/2 ⁻)	E2	0.01192	α(K)=0.00952 14; α(L)=0.00186 3; α(M)=0.000428 6 α(N)=0.0001003 14; α(O)=1.406×10 ⁻⁵ 20; α(P)=6.49×10 ⁻⁷ 9 DCO=1.03 15.
2802.61	(29/2 ⁺)	406.70 10	100	2395.92	(27/2 ⁻)	(E1)	0.01003	α(K)=0.00845 12; α(L)=0.001232 18; α(M)=0.000275 4

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Adopted Levels, Gammas (continued)

$\gamma(^{157}\text{Lu})$ (continued)								Comments
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	$\alpha^\dagger$	
								$\alpha(\text{N})=6.45\times 10^{-5}$ 9; $\alpha(\text{O})=9.36\times 10^{-6}$ 14; $\alpha(\text{P})=5.36\times 10^{-7}$ 8 DCO=0.55 6. $A_2=-0.35$ 2.
2877.2	(29/2 ⁻)	748.5 5	100	2128.61	(25/2 ⁻)	(E2)	0.00718	$\alpha(\text{K})=0.00585$ 9; $\alpha(\text{L})=0.001031$ 15; $\alpha(\text{M})=0.000235$ 4 $\alpha(\text{N})=5.52\times 10^{-5}$ 8; $\alpha(\text{O})=7.87\times 10^{-6}$ 12; $\alpha(\text{P})=4.02\times 10^{-7}$ 6
2936.51	(31/2 ⁺)	133.90 10	100	2802.61	(29/2 ⁺)	M1	1.598	$\alpha(\text{K})=1.334$ 19; $\alpha(\text{L})=0.205$ 3; $\alpha(\text{M})=0.0462$ 7 $\alpha(\text{N})=0.01091$ 16; $\alpha(\text{O})=0.001616$ 23; $\alpha(\text{P})=9.99\times 10^{-5}$ 15 DCO=0.51 12.
3107.6	(31/2 ⁻)	230.1 3	24 4	2877.2	(29/2 ⁻)	(M1)	0.352	$\alpha(\text{K})=0.294$ 5; $\alpha(\text{L})=0.0448$ 7; $\alpha(\text{M})=0.01008$ 15 $\alpha(\text{N})=0.00238$ 4; $\alpha(\text{O})=0.000353$ 6; $\alpha(\text{P})=2.19\times 10^{-5}$ 4
		711.7 4	100 10	2395.92	(27/2 ⁻)	E2	0.00803	$\alpha(\text{K})=0.00651$ 10; $\alpha(\text{L})=0.001172$ 17; $\alpha(\text{M})=0.000268$ 4 $\alpha(\text{N})=6.29\times 10^{-5}$ 9; $\alpha(\text{O})=8.94\times 10^{-6}$ 13; $\alpha(\text{P})=4.47\times 10^{-7}$ 7 $A_2=+0.33$ 10.
3487.7	(33/2 ⁺)	551.16 14	100	2936.51	(31/2 ⁺)	M1	0.0345	$\alpha(\text{K})=0.0290$ 4; $\alpha(\text{L})=0.00431$ 6; $\alpha(\text{M})=0.000965$ 14 $\alpha(\text{N})=0.000228$ 4; $\alpha(\text{O})=3.39\times 10^{-5}$ 5; $\alpha(\text{P})=2.12\times 10^{-6}$ 3 $A_2=-0.43$ 15.
3625.0	(33/2 ⁻)	748.4 5	100	2877.2	(29/2 ⁻)	(E2)	0.00718	$\alpha(\text{K})=0.00585$ 9; $\alpha(\text{L})=0.001031$ 15; $\alpha(\text{M})=0.000235$ 4 $\alpha(\text{N})=5.52\times 10^{-5}$ 8; $\alpha(\text{O})=7.88\times 10^{-6}$ 12; $\alpha(\text{P})=4.02\times 10^{-7}$ 6
3644.3	(33/2 ⁺)	708.0 2	100	2936.51	(31/2 ⁺)	(M1)	0.0183	$\alpha(\text{K})=0.01535$ 22; $\alpha(\text{L})=0.00226$ 4; $\alpha(\text{M})=0.000506$ 7 $\alpha(\text{N})=0.0001195$ 17; $\alpha(\text{O})=1.779\times 10^{-5}$ 25; $\alpha(\text{P})=1.119\times 10^{-6}$ 16 $A_2=-0.38$ 10.
3753.1	(35/2 ⁺)	109.0 2	5.9 11	3644.3	(33/2 ⁺)	(M1)	2.87	$\alpha(\text{K})=2.40$ 4; $\alpha(\text{L})=0.370$ 6; $\alpha(\text{M})=0.0832$ 13 $\alpha(\text{N})=0.0197$ 3; $\alpha(\text{O})=0.00291$ 5; $\alpha(\text{P})=0.000180$ 3
		265.4 3	13 3	3487.7	(33/2 ⁺)	(M1)	0.238	$\alpha(\text{K})=0.199$ 3; $\alpha(\text{L})=0.0303$ 5; $\alpha(\text{M})=0.00680$ 10 $\alpha(\text{N})=0.001607$ 23; $\alpha(\text{O})=0.000238$ 4; $\alpha(\text{P})=1.480\times 10^{-5}$ 22
		816.52 12	100 5	2936.51	(31/2 ⁺)	E2	0.00594	$\alpha(\text{K})=0.00487$ 7; $\alpha(\text{L})=0.000831$ 12; $\alpha(\text{M})=0.000189$ 3 $\alpha(\text{N})=4.44\times 10^{-5}$ 7; $\alpha(\text{O})=6.37\times 10^{-6}$ 9; $\alpha(\text{P})=3.36\times 10^{-7}$ 5 DCO=0.96 17. $A_2=+0.23$ 4.
3824.6	(35/2 ⁻)	199.63 11	<50	3625.0	(33/2 ⁻)	(M1)	0.521	$\alpha(\text{K})=0.435$ 7; $\alpha(\text{L})=0.0665$ 10; $\alpha(\text{M})=0.01496$ 21 $\alpha(\text{N})=0.00353$ 5; $\alpha(\text{O})=0.000524$ 8; $\alpha(\text{P})=3.25\times 10^{-5}$ 5
		717.0 2	100 9	3107.6	(31/2 ⁻)	E2	0.00789	$\alpha(\text{K})=0.00641$ 9; $\alpha(\text{L})=0.001150$ 17; $\alpha(\text{M})=0.000263$ 4

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Adopted Levels, Gammas (continued)

$\gamma(^{157}\text{Lu})$ (continued)								Comments
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	$\alpha^\dagger$	
4222.4	(37/2 ⁺)	469.35 11	100 6	3753.1	(35/2 ⁺)	M1	0.0523	$\alpha(\text{N})=6.17\times 10^{-5}$ 9; $\alpha(\text{O})=8.77\times 10^{-6}$ 13; $\alpha(\text{P})=4.40\times 10^{-7}$ 7 $A_2=+0.39$ 6.
		734.4 4	23 3	3487.7	(33/2 ⁺)	E2	0.00748	$\alpha(\text{K})=0.0439$ 7; $\alpha(\text{L})=0.00655$ 10; $\alpha(\text{M})=0.001469$ 21 $\alpha(\text{N})=0.000347$ 5; $\alpha(\text{O})=5.16\times 10^{-5}$ 8; $\alpha(\text{P})=3.23\times 10^{-6}$ 5 DCO=0.86 19. $A_2=-0.16$ 5.
4422.2	(39/2 ⁺)	199.73 11	55 4	4222.4	(37/2 ⁺)	M1	0.520	$\alpha(\text{K})=0.00609$ 9; $\alpha(\text{L})=0.001082$ 16; $\alpha(\text{M})=0.000247$ 4 $\alpha(\text{N})=5.80\times 10^{-5}$ 9; $\alpha(\text{O})=8.26\times 10^{-6}$ 12; $\alpha(\text{P})=4.19\times 10^{-7}$ 6 $A_2=+0.44$ 12.
		669.11 12	100 6	3753.1	(35/2 ⁺)	E2	0.00923	$\alpha(\text{K})=0.434$ 7; $\alpha(\text{L})=0.0664$ 10; $\alpha(\text{M})=0.01494$ 21 $\alpha(\text{N})=0.00353$ 5; $\alpha(\text{O})=0.000523$ 8; $\alpha(\text{P})=3.24\times 10^{-5}$ 5 DCO=0.54 12. $\alpha(\text{K})=0.00745$ 11; $\alpha(\text{L})=0.001377$ 20; $\alpha(\text{M})=0.000316$ 5 $\alpha(\text{N})=7.41\times 10^{-5}$ 11; $\alpha(\text{O})=1.047\times 10^{-5}$ 15; $\alpha(\text{P})=5.10\times 10^{-7}$ 8 DCO=1.02 18. $A_2=+0.28$ 6.
4555.2	(41/2 ⁺)	730.5 5	100	3824.6	(35/2 ⁻)	M1	0.179	$\alpha(\text{K})=0.1498$ 21; $\alpha(\text{L})=0.0227$ 4; $\alpha(\text{M})=0.00510$ 8
4717.1		294.92 10	100 4	4422.2	(39/2 ⁺)			$\alpha(\text{N})=0.001204$ 17; $\alpha(\text{O})=0.000179$ 3; $\alpha(\text{P})=1.111\times 10^{-5}$ 16 DCO=0.76 20. $A_2=-0.27$ 5.
4845.1	(43/2 ⁺)	494.5 2	21 3	4222.4	(37/2 ⁺)	E2	0.0191	$\alpha(\text{K})=0.01490$ 21; $\alpha(\text{L})=0.00325$ 5; $\alpha(\text{M})=0.000756$ 11 $\alpha(\text{N})=0.0001766$ 25; $\alpha(\text{O})=2.43\times 10^{-5}$ 4; $\alpha(\text{P})=1.003\times 10^{-6}$ 14 $A_2=+0.46$ 10.
		128.07 11	100	4717.1	(41/2 ⁺)	M1	1.81	$\alpha(\text{K})=1.514$ 22; $\alpha(\text{L})=0.233$ 4; $\alpha(\text{M})=0.0524$ 8 $\alpha(\text{N})=0.01238$ 18; $\alpha(\text{O})=0.00184$ 3; $\alpha(\text{P})=0.0001134$ 17 DCO=0.62 22.
4946.9	(43/2 ⁺)	524.9 3	100	4422.2	(39/2 ⁺)	E2	0.01645	$\alpha(\text{K})=0.01293$ 19; $\alpha(\text{L})=0.00272$ 4; $\alpha(\text{M})=0.000630$ 9 $\alpha(\text{N})=0.0001474$ 21; $\alpha(\text{O})=2.04\times 10^{-5}$ 3; $\alpha(\text{P})=8.74\times 10^{-7}$ 13 $A_2=1.6$ 4.
5107.1	(45/2 ⁺)	160.3 3	100 23	4946.9	(43/2 ⁺)	(M1)	0.961	$\alpha(\text{K})=0.803$ 12; $\alpha(\text{L})=0.1232$ 19; $\alpha(\text{M})=0.0277$ 5 $\alpha(\text{N})=0.00654$ 10; $\alpha(\text{O})=0.000970$ 15; $\alpha(\text{P})=6.00\times 10^{-5}$ 9
5115.5	(47/2 ⁺)	389.94 11	<115	4717.1	(41/2 ⁺)	(E2)	0.0359	$\alpha(\text{K})=0.0269$ 4; $\alpha(\text{L})=0.00692$ 10; $\alpha(\text{M})=0.001633$ 23 $\alpha(\text{N})=0.000380$ 6; $\alpha(\text{O})=5.12\times 10^{-5}$ 8; $\alpha(\text{P})=1.762\times 10^{-6}$ 25
		270.42 11	100	4845.1	(43/2 ⁺)	(E2)	0.1051	$\alpha(\text{K})=0.0715$ 10; $\alpha(\text{L})=0.0257$ 4;

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Adopted Levels, Gammas (continued)

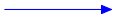
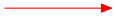
$\gamma(^{157}\text{Lu})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	$\alpha^\dagger$	Comments
								$\alpha(\text{M})=0.00618\ 9$ $\alpha(\text{N})=0.001433\ 21$; $\alpha(\text{O})=0.000186\ 3$; $\alpha(\text{P})=4.40\times 10^{-6}\ 7$ DCO=0.9 3.
5322.9		477.8 2	100 14	4845.1 (43/2 ⁺)				
		605.8 5	<320	4717.1 (41/2 ⁺)				
5426.9	(47/2 ⁺)	319.6 2	45 5	5107.1 (45/2 ⁺)		(M1)	0.1443	$\alpha(\text{K})=0.1208\ 17$; $\alpha(\text{L})=0.0183\ 3$; $\alpha(\text{M})=0.00410\ 6$ $\alpha(\text{N})=0.000968\ 14$; $\alpha(\text{O})=0.0001437\ 21$; $\alpha(\text{P})=8.94\times 10^{-6}\ 13$ $A_2=-0.39\ 26$.
		582.1 2	100 11	4845.1 (43/2 ⁺)		(E2)	0.01278	$\alpha(\text{K})=0.01017\ 15$; $\alpha(\text{L})=0.00201\ 3$; $\alpha(\text{M})=0.000465\ 7$ $\alpha(\text{N})=0.0001089\ 16$; $\alpha(\text{O})=1.523\times 10^{-5}\ 22$; $\alpha(\text{P})=6.93\times 10^{-7}\ 10$
6089.5		662.9 3	<150	5426.9 (47/2 ⁺)				
		1244.0 4	100 18	4845.1 (43/2 ⁺)				
6175.8		1060.3 4	100	5115.5 (47/2 ⁺)				
6184.6		861.7 3	100	5322.9				
6789.6		605.0 5	<210	6184.6				
		700.1 3	100 14	6089.5				
7090.2		300.63 11	100	6789.6		E2	0.0760	$\alpha(\text{K})=0.0535\ 8$; $\alpha(\text{L})=0.01729\ 25$; $\alpha(\text{M})=0.00413\ 6$ $\alpha(\text{N})=0.000960\ 14$; $\alpha(\text{O})=0.0001257\ 18$; $\alpha(\text{P})=3.36\times 10^{-6}\ 5$ DCO=1.2 4. $A_2=+0.25\ 5$.
8224.7		1134.5 5	100	7090.2				
8538.4		313.7 2	100	8224.7				

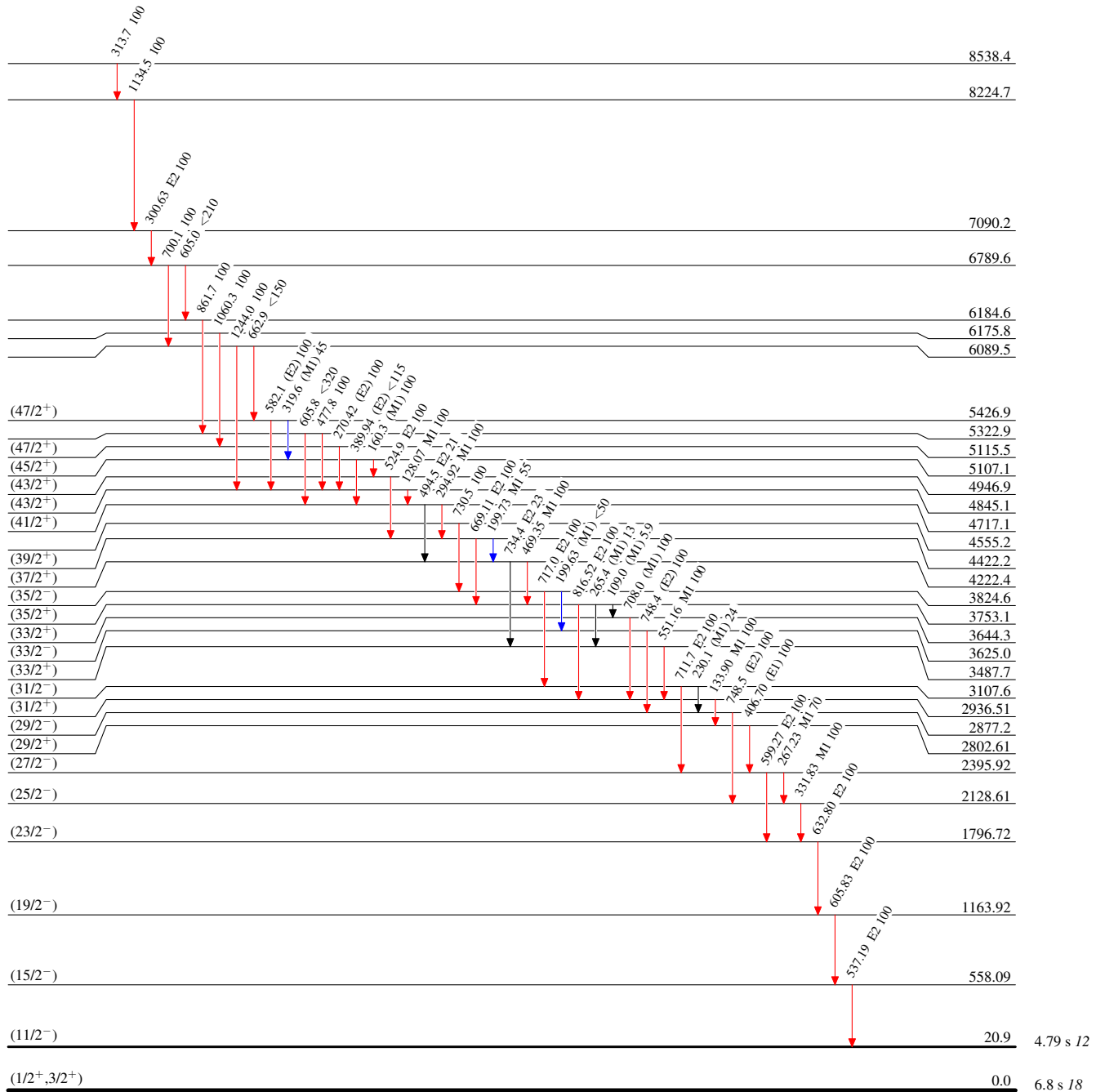
[†] Additional information 3.

Adopted Levels, Gammas**Level Scheme**

Intensities: Type not specified

Legend

-  $I_\gamma < 2\% \times I_\gamma^{\max}$
 $I_\gamma < 10\% \times I_\gamma^{\max}$
 $I_\gamma > 10\% \times I_\gamma^{\max}$



Adopted Levels, Gammas