^{111}Rh β^- decay (11 s) 1992PeZX,1984KaZW,1978Fr16

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 110, 1239 (2009)	1-Feb-2008

Parent: ^{111}Rh: E=0.0; J^π=(7/2$^+$); $T_{1/2}$=11 s *1*; Q(β^-)=3.65×10^3 *3*; %β^- decay=100.0
Sources: ^{235}U,^{239}Pu,^{249}Cf(n,F) E=th, ^{238}U(n,F) E=14.8 MeV, chem.
Measured γ-singles, $\gamma\gamma$-coin (semi) (1984KaZW,1978Fr16) on-line radiochemical separations (1984KaZW).
1992PeZX: ^{238}U(p,F), E=20 MeV, on-line isotope separator IGISOL.
Measured: γ, $\gamma\gamma$, γ(t), ce,Ge(Li), Ge, Si(Li), ELLI spectrometer.
The level scheme is from 1992PeZX. It is based on levels known from (d,p) and $\gamma\gamma$ coin (1984KaZW).

^{111}Pd Levels

E(level)	J^π	$T_{1/2}$[†]	Comments
0.0	5/2$^+$	23.4 min *2*	
72.2	1/2$^+$		
191.3	(+)		J^π: (7/2$^-$) given by 1984KaZW not adopted.
195.1			
230.8	7/2$^+$,9/2$^+$		
259.3			
275.4	3/2$^+$,5/2$^+$		
384.2?	3/2,5/2$^+$		
411.8	7/2$^+$,9/2$^+$		
450.4			
523.9			J^π: (5/2,7/2) from 1984KaZW not adopted.
663.8	(5/2$^+$,7/2$^+$)		
789.0			J^π: (5/2$^+$) from 1984KaZW not adopted.
1082.8			
1090.2			J^π: (5/2$^+$) from 1984KaZW not adopted.
1207.2?			

[†] From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Comments
(2.56×10^3 *3*)	1090.2	0.7	av Eβ=1089 syst
(2.86×10^3 *3*)	789.0	4.0	av Eβ=1230 syst
(3.37×10^3 *3*)	275.4	75.5	av Eβ=1472 syst
(3.45×10^3 *3*)	195.1	3.9	av Eβ=1510 syst
(3.46×10^3 *3*)	191.3	2.2	av Eβ=1512 syst
(3.58×10^3 *3*)	72.2	2.3	av Eβ=1569 syst

[†] Calculated with GTOL. Has to be considered as preliminary.
[‡] Absolute intensity per 100 decays.

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$\gamma(^{111}Pd)$

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [#]	Comments
44.8 *4*	0.14 *4*	275.4	3/2$^+$,5/2$^+$	230.8	7/2$^+$,9/2$^+$			
[x]71.0 *2*	0.94 *12*							α(K)exp= 1.14 *17* (1992PeZX)
72.3 *2*	1.36 *6*	72.2	1/2$^+$	0.0	5/2$^+$	E2	4.49	α(K)=3.17; α(L)=1.071; α(M)=0.2069; α(N+..)=0.0355 α(K)exp= 1.8 *3* (1992PeZX)
80.1 *3*	0.26 *5*	275.4	3/2$^+$,5/2$^+$	195.1				
84.7 *2*	0.43 *9*	275.4	3/2$^+$,5/2$^+$	191.3	(+)			
[x]116.5 *2*	1.13 *11*							α(K)exp= 0.15 *4* (1992PeZX)
123.0 *2*	2.00 *9*	195.1		72.2	1/2$^+$	M1	0.2140	α(K)=0.1862; α(L)=0.02277; α(M)=0.00428; α(N+..)=0.00080 α(K)exp= 0.123 *15* (1992PeZX)
[x]136.4 *3*								E_γ,I_γ: reported by 1984KaZW with Iγ=1.0; however, 1992PeZX assign most of this transition to ^{111}Ru decay. Also, placement from the 411 level is not confirmed by 1992PeZX.
181.0 *3*	1.20 *13*	411.8	7/2$^+$,9/2$^+$	230.8	7/2$^+$,9/2$^+$			
187.0 *3*	1.25 *7*	259.3		72.2	1/2$^+$			
189.2[‡] *3*	0.4	384.2?	3/2,5/2$^+$	195.1				
191.2[@] *2*	1.95[@] *15*	191.3	(+)	0.0	5/2$^+$			
191.2[@] *3*	1.4[@]	450.4		259.3				
195.2 *2*	1.4 *2*	195.1		0.0	5/2$^+$			
220.5 *3*	0.26 *5*	411.8	7/2$^+$,9/2$^+$	191.3	(+)			
231.0 *2*	8.9 *5*	230.8	7/2$^+$,9/2$^+$	0.0	5/2$^+$	M1	0.0391	α(K)=0.0341; α(L)=0.00409; α(M)=0.00077; α(N+..)=0.00014 α(K)exp= 0.032 *8* (1992PeZX)
255.0 *3*	0.47 *7*	450.4		195.1				
259.3[@] *3*	1.55[@] *18*	259.3		0.0	5/2$^+$			
259.3[@] *3*	1.55[@] *18*	450.4		191.3	(+)			
275.4 *1*	100.0 *4*	275.4	3/2$^+$,5/2$^+$	0.0	5/2$^+$	M1	0.02481	α(K)=0.02165; α(L)=0.00258; α(M)=0.00048 α(K)exp= 0.0231 *5*; K/L=8.0 *13* (1992PeZX)
293.0[‡] *3*	0.3	523.9		230.8	7/2$^+$,9/2$^+$			
312.0[‡] *3*	1.3	384.2?	3/2,5/2$^+$	72.2	1/2$^+$			
377.0[‡] *3*	≤0.5	789.0		411.8	7/2$^+$,9/2$^+$			
384.2[‡&] *3*		384.2?	3/2,5/2$^+$	0.0	5/2$^+$			
388.5[‡] *3*	1.3	663.8	(5/2$^+$,7/2$^+$)	275.4	3/2$^+$,5/2$^+$			
411.8 *2*	9.42 *18*	411.8	7/2$^+$,9/2$^+$	0.0	5/2$^+$			α(K)exp= 0.010 *3* (1992PeZX)
449.9 *3*	0.78 *16*	450.4		0.0	5/2$^+$			
513.5[‡] *3*	0.8	789.0		275.4	3/2$^+$,5/2$^+$			
523.9[‡] *3*	0.5	523.9		0.0	5/2$^+$			
529.5 *3*	0.8	789.0		259.3				
558.3 *3*	1.7 *3*	789.0		230.8	7/2$^+$,9/2$^+$			
594.1 *4*	1.5 *2*	789.0		195.1				
663.8[‡] *3*	0.5	663.8	(5/2$^+$,7/2$^+$)	0.0	5/2$^+$			
678.5[‡] *3*	<0.5	1090.2		411.8	7/2$^+$,9/2$^+$			
788.9 *3*	3.8 *5*	789.0		0.0	5/2$^+$			
807.5[‡] *3*	1.1	1082.8		275.4	3/2$^+$,5/2$^+$			
813.6 *6*	0.4 *2*	1090.2		275.4	3/2$^+$,5/2$^+$			
830.5 *5*	0.6 *2*	1090.2		259.3				

Continued on next page (footnotes at end of table)

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$\gamma(^{111}Pd)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
852.0‡ *3*	0.3	1082.8		230.8	$7/2^+,9/2^+$	931.8‡ *3*	0.8	1207.2?		275.4	$3/2^+,5/2^+$
859.4‡ *3*	1.3	1090.2		230.8	$7/2^+,9/2^+$	976.5‡ *3*	0.2	1207.2?		230.8	$7/2^+,9/2^+$
891.5‡ *3*	0.8	1082.8		191.3	$(^+)$	[x]1202.2 *6*					
895.0‡ *3*	1.0	1090.2		195.1							

† From 1992PeZX, except where noted otherwise.
‡ Seen only by 1984KaZW.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[@] Multiply placed with undivided intensity.
[&] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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Decay Scheme

Intensities: Type not specified
& Multiply placed: undivided intensity given