^{116}Rh β^- decay (0.57 s) 2001Wa04,1988Ay02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111, 717 (2010)	1-Dec-2009

Parent: ^{116}Rh: E=150; J$^\pi$=(6$^-$); T$_{1/2}$=0.57 s *5*; Q(β^-)=9.22×10^3 *15*; %β^- decay=100.0

^{116}Rh-E: from 1997Au04.

By taking advantage of higher production yields and more efficiency, detectors, 2001Wa04, same group as 1988Ay02 have remeasured the decay of ^{116}Rh.

Activity: ^{238}U(p,F) E(p)=20 MeV, mass separator IGISOL.

After each cycle, the acquisition system was blocked while the tape moved forward about 20 cm in 0.3 s. In the detection setup, a 2 mm thick BC408 cylindrical plastic scintillator was used for detection of β particles with the total efficiency of about 60%. Four large volume Eurogam phase-I Ge detectors with relative efficiency of 70% in each, were used to detect γ rays.

Measured: γ, $\gamma\gamma$, βce, T$_{1/2}$,Ge(Li), Si(Li).

Conversion electron measurements support the E2 character for 340γ, 538γ. No evidence for strong E0 transition (1988Ay02).

Authors have assign the intensities of the gammas by assuming that the 1$^+$ decay directly populates only states with I<2. This argument is supported by the intensity balance for the 1066.2-keV 3$^+$ level indicating no direct β feeding. Accordingly, only the 340.3-keV 2$^+$ and 737.9 *2+* levels are populated in both β decays. The intensities of 340.3, 397.7, and 737.8-keV γ transitions are then separated, as the β feedings must be negligible to the 340.3 and 737.9-keV levels in the decay of high-spin isomer.

^{116}Pd Levels

E(level)	J$^\pi$	E(level)	J$^\pi$	E(level)	J$^\pi$	E(level)	J$^\pi$
0.0	0$^+$	1694.87 *15*	(3$^-$,4$^+$)	2333.1 *5*		2617.2 *4*	
340.26 *8*	2$^+$	1718.21 *14*	5$^+$	2343.4 *4*	(8$^+$)	2654.3 *5*	(7$^-$)
737.85 *8*	2$^+$	1809.88 *12*	4$^-$	2432.72 *24*		2718.01 *21*	
877.58 *12*	4$^+$	1982.39 *13*	5$^-$	2435.44 *19*	(7$^-$)	2812.5 *5*	
1066.21 *10*	3$^+$	2101.0 *4*	(6$^+$)	2448.52 *13*	(6$^-$)	2868.95 *17*	
1373.01 *13*	4$^+$	2275.64 *17*	(6$^-$)	2491.6 *4*	7$^+$		
1558.98 *14*	6$^+$	2315.56 *16*		2603.25 *23*			

β^- radiations

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(6.50×10^3 *15*)	2868.95	4.3 *5*	5.87 *8*	av Eβ=2919 *72*
(6.56×10^3 *15*)	2812.5	0.6 *1*	6.75 *10*	av Eβ=2946 *72*
(6.65×10^3 *15*)	2718.01	2.6 *3*	6.14 *8*	av Eβ=2991 *72*
(6.72×10^3 *15*)	2654.3	0.7 *1*	6.73 *9*	av Eβ=3021 *72*
(6.75×10^3 *15*)	2617.2	1.2 *1*	6.50 *7*	av Eβ=3039 *72*
(6.77×10^3 *15*)	2603.25	4.2 *5*	5.96 *8*	av Eβ=3045 *72*
(6.88×10^3 *15*)	2491.6	1.1 *1*	6.58 *7*	av Eβ=3099 *72*
(6.92×10^3 *15*)	2448.52	26.8 *25*	5.20 *7*	av Eβ=3119 *72*
(6.93×10^3 *15*)	2435.44	10.9 *11*	5.60 *8*	av Eβ=3125 *72*
(6.94×10^3 *15*)	2432.72	1.7 *5*	6.40 *14*	av Eβ=3127 *72*
(7.03×10^3 *15*)	2343.4	1.0 *1*	6.66 *8*	av Eβ=3169 *72*
(7.04×10^3 *15*)	2333.1	1.9 *5*	6.38 *13*	av Eβ=3174 *72*
(7.05×10^3 *15*)	2315.56	4.5 *7*	6.01 *9*	av Eβ=3183 *72*
(7.09×10^3 *15*)	2275.64	8.6 *9*	5.74 *8*	av Eβ=3202 *72*
(7.27×10^3 *15*)	2101.0	1.1 *3*	6.68 *13*	av Eβ=3285 *72*
(7.39×10^3 *15*)	1982.39	6.5 *18*	5.94 *14*	av Eβ=3341 *72*
(7.56×10^3 *15*)	1809.88	0.9 *21*	6.8 *11*	av Eβ=3424 *72*
(7.65×10^3 *15*)	1718.21	3.6 *10*	6.27 *14*	av Eβ=3467 *72*
(7.68×10^3 *15*)	1694.87	4.8 *8*	6.15 *9*	av Eβ=3478 *72*
(7.81×10^3 *15*)	1558.98	0.4 *14*	7.3 *16*	av Eβ=3543 *72*

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^{116}Rh β^- decay (0.57 s) 2001Wa04,1988Ay02 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- †	Log *ft*	Comments
(8.00×10^3 *15*)	1373.01	3.9 *10*	6.32 *13*	av Eβ=3632 *72*
(8.49×10^3 *15*)	877.58	7 *4*	6.2 *3*	av Eβ=3867 *72*

† Absolute intensity per 100 decays.

γ(^{116}Pd)

Iγ normalization: from Σ I(γ+ce to g.s.)=^{100}'Noβ to g.s..

E$_\gamma$	I$_\gamma$ †	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
172.4 *2*	1.1 *2*	1982.39	5$^-$	1809.88	4$^-$
269.5 *2*	1.5 *1*	2718.01		2448.52	(6$^-$)
287.7 *2*	3.5 *2*	2603.25		2315.56	
293.2 *3*	3.3 *2*	2275.64	(6$^-$)	1982.39	5$^-$
328.4 *1*	19.1 *12*	1066.21	3$^+$	737.85	2$^+$
340.3 *1*	100.0	340.26	2$^+$	0.0	0$^+$
397.7 *1*	19.2 *27*	737.85	2$^+$	340.26	2$^+$
420.5 *2*	1.0 *1*	2868.95		2448.52	(6$^-$)
437.1 *2*	1.2 *2*	1809.88	4$^-$	1373.01	4$^+$
453.0 *2*	2.7 *4*	2435.44	(7$^-$)	1982.39	5$^-$
465.8 *2*	3.9 *6*	2275.64	(6$^-$)	1809.88	4$^-$
466.1 *1*	12.8 *11*	2448.52	(6$^-$)	1982.39	5$^-$
495.5 *2*	2.9 *2*	1373.01	4$^+$	877.58	4$^+$
537.3 *1*	52.9 *40*	877.58	4$^+$	340.26	2$^+$
553.5 *2*	2.0 *1*	2868.95		2315.56	
557.4 *2*	2.5 *2*	2275.64	(6$^-$)	1718.21	5$^+$
609.4 *2*	3.0 *2*	1982.39	5$^-$	1373.01	4$^+$
620.9 *2*	8.2 *5*	2315.56		1694.87	(3$^-$,4$^+$)
628.9 *2*	8.7 *6*	1694.87	(3$^-$,4$^+$)	1066.21	3$^+$
635.3 *2*	8.3 *10*	1373.01	4$^+$	737.85	2$^+$
638.7 *1*	19.4 *14*	2448.52	(6$^-$)	1809.88	4$^-$
652.0 *1*	11.1 *10*	1718.21	5$^+$	1066.21	3$^+$
681.4 *1*	15.9 *14*	1558.98	6$^+$	877.58	4$^+$
714.5 *2*	1.9 *5*	2432.72		1718.21	5$^+$
725.9 *1*	27.9 *20*	1066.21	3$^+$	340.26	2$^+$
728.0 *3*	1.2 *3*	2101.0	(6$^+$)	1373.01	4$^+$
737.8 *1*	13.2 *16*	737.85	2$^+$	0.0	0$^+$
743.6 *1*	25.5 *18*	1809.88	4$^-$	1066.21	3$^+$
773.4 *3*	1.2 *1*	2491.6	7$^+$	1718.21	5$^+$
784.4 *3*	1.1 *1*	2343.4	(8$^+$)	1558.98	6$^+$
876.5 *2*	9.6 *7*	2435.44	(7$^-$)	1558.98	6$^+$
886.5 *3*	0.6 *1*	2868.95		1982.39	5$^-$
889.5 *4*	0.6 *2*	2448.52	(6$^-$)	1558.98	6$^+$
899.0 *3*	1.4 *1*	2617.2		1718.21	5$^+$
942.5 *2*	1.4 *1*	2315.56		1373.01	4$^+$
957.0 *2*	4.9 *4*	1694.87	(3$^-$,4$^+$)	737.85	2$^+$
1044.2 *4*	1.2 *3*	2603.25		1558.98	6$^+$
1058.7 *3*	1.3 *4*	2868.95		1809.88	4$^-$
1095.3 *4*	0.8 *1*	2654.3	(7$^-$)	1558.98	6$^+$
1104.7 *2*	22.7 *16*	1982.39	5$^-$	877.58	4$^+$
1159.0 *3*	1.4 *1*	2718.01		1558.98	6$^+$

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^{116}Rh β^- decay (0.57 s) 2001Wa04,1988Ay02 (continued)

$\gamma(^{116}Pd)$ (continued)

E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f
1253.5 *4*	0.7 *1*	2812.5		1558.98	6^+
1437.7 *6*	1.0 *3*	2315.56		877.58	4^+
1455.5 *4*	2.1 *6*	2333.1		877.58	4^+

† For absolute intensity per 100 decays, multiply by 0.88 *9*.

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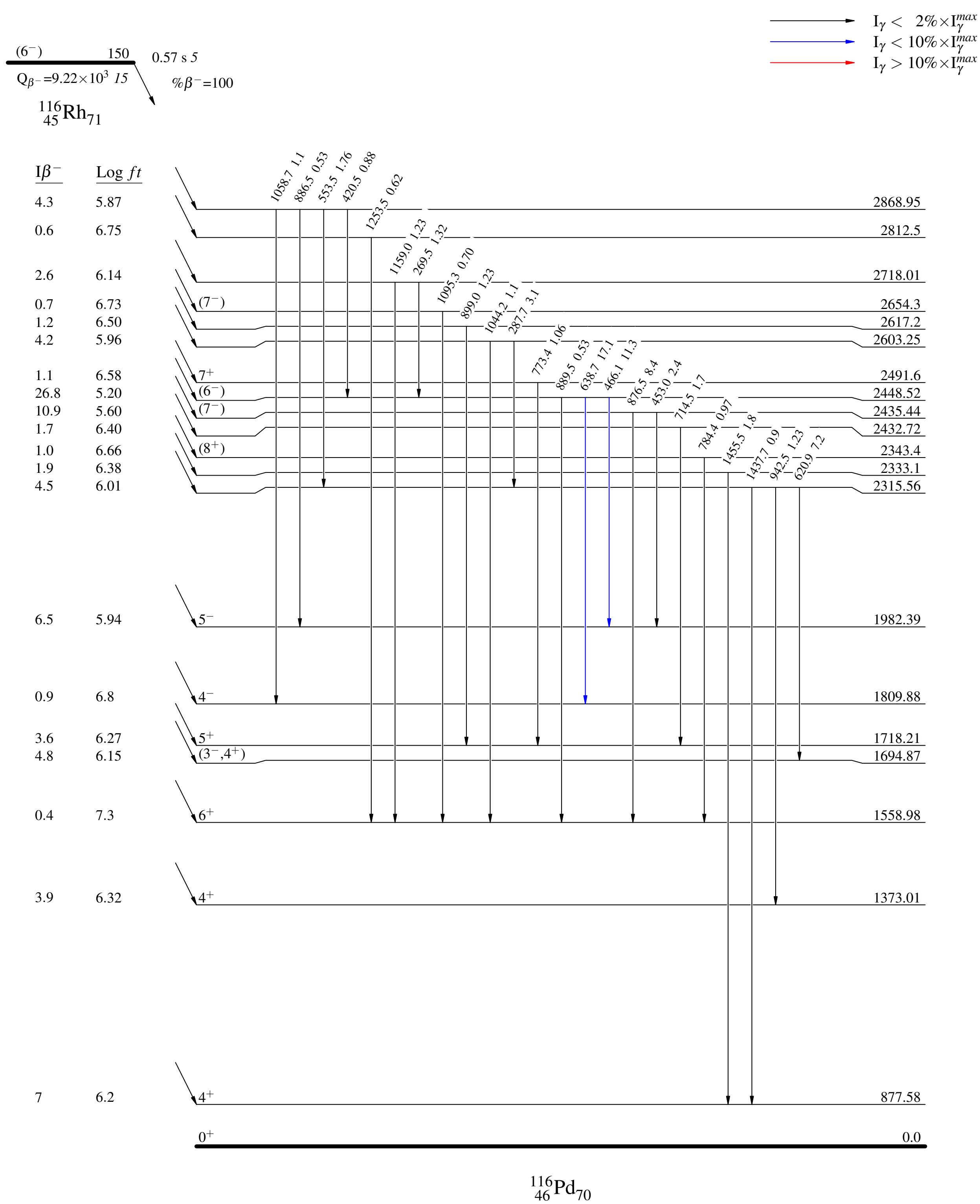
Decay Scheme

Intensities: I_γ per 100 parent decays



^{116}Rh β^- decay (0.57 s) 2001Wa04,1988Ay02

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays