

¹¹⁴Rh β⁻ decay (1.85 s):J=(7⁻) 2003Lh01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 113, 515 (2012)	1-Jan-2012

Parent: ¹¹⁴Rh: E=2.0×10² 15; J^π=(7⁻); T_{1/2}=1.85 s 6; Q(β⁻)=7.78×10³ 7; %β⁻ decay=100.0

¹¹⁴Rh-E: from systematics (2003Au03).

¹¹⁴Rh-Q(β⁻): from systematics (2011AuZZ).

Activity: ²³⁸U(p,F), E=20 MeV, on-line isotope separator IGISOL.

The first work of 1988Ay02 used the same facility but the new work benefited from production yields improved by two orders of magnitude.

Measured Eγ, Iγ, γγ, and βγ using four Ge detectors.

¹¹⁴Pd Levels

E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π
0 [‡]	0 ⁺	2090.34 22	(4 ⁻ ,5 ⁺)	2611.3 3	(6 ⁺)	2953.4 4	(6 ⁻)
332.61 [‡] 10	2 ⁺	2184.03 19	(5 ⁻)	2623.28 18	(6 ⁻)	2997.4 3	
694.62 [#] 15	2 ⁺	2215.8 [‡] 4	8 ⁺	2687.7 3	(6)	3055.4 5	
852.39 [‡] 16	4 ⁺	2290.0 [#] 3	7 ⁺	2738.6 3		3064.42 23	(6,7) ⁻
1011.66 [#] 16	3 ⁺	2316.1 3		2752.0 4	(6,7 ⁻)	3078.3 3	(6,7)
1319.91 [#] 18	4 ⁺	2349.68 22	(5 ⁻ ,6 ⁺)	2789.35 24	(6,7 ⁻)	3099.2 4	(6,7 ⁺)
1500.53 [‡] 19	6 ⁺	2398.5 4		2792.8 4		3128.37 20	(6 ⁻)
1630.69 [#] 18	5 ⁺	2446.8 3	(6 ⁺)	2821.6 4		3138.78 23	(6 ⁻)
1638.73 21	(3 ⁻ ,4 ⁺)	2520.19 19	(6 ⁻)	2853.2 4		3161.9 4	
1983.72 [#] 21	6 ⁺	2562.8 5	(6 ⁺)	2892.3 4		3423.9 4	
2065.17 19	(4 ⁻)	2598.42 23	(7 ⁻)	2927.5 4			

[†] From least-squares fit to Eγ's.

[‡] Band(A): g.s. band.

[#] Band(B): γ band.

β⁻ radiations

The β⁻ feedings and associated log ft values deduced from gamma-ray intensity balances and using codes GTOL and log ft. These agree with those given by 2003Lh01. The beta feedings and logft values should be considered as limits only.

E(decay)	E(level)	Iβ ^{-†}	Log ft	Comments
(4.56×10 ³ 17)	3423.9	0.6 3	6.58 24	av Eβ=2024 89
(4.82×10 ³ 17)	3161.9	0.8 3	6.56 18	av Eβ=2149 89
(4.84×10 ³ 17)	3138.78	5.3 8	5.75 10	av Eβ=2160 89
(4.85×10 ³ 17)	3128.37	7.2 10	5.62 10	av Eβ=2165 89
(4.88×10 ³ 17)	3099.2	1.7 5	6.26 15	av Eβ=2179 89
(4.90×10 ³ 17)	3078.3	2.2 5	6.16 13	av Eβ=2189 89
(4.92×10 ³ 17)	3064.42	4.9 8	5.81 11	av Eβ=2195 89
(4.92×10 ³ 17)	3055.4	0.7 4	6.7 3	av Eβ=2200 89
(4.98×10 ³ 17)	2997.4	1.2 4	6.45 17	av Eβ=2227 89
				Iβ ⁻ : 1.3 4 (2003Lh01).
(5.03×10 ³ 17)	2953.4	0.6 3	6.77 23	av Eβ=2248 89
(5.05×10 ³ 17)	2927.5	0.6 3	6.78 23	av Eβ=2261 89
(5.09×10 ³ 17)	2892.3	0.7 3	6.72 20	av Eβ=2278 89

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$^{114}\text{Rh}\beta^-$ decay (1.85 s):J=(7⁻) **2003Lh01** (continued)

β^- radiations (continued)

E(decay)	E(level)	$I\beta^-^\dagger$	Log ft	Comments
(5.13×10 ³ 17)	2853.2	0.9 4	6.63 21	av E β =2296 89
(5.16×10 ³ ‡ 17)	2821.6	0.5 3	6.9 3	av E β =2311 89
(5.19×10 ³ 17)	2792.8	1.7 4	6.38 13	av E β =2325 89
(5.19×10 ³ 17)	2789.35	3.2 6	6.10 11	av E β =2327 89
(5.23×10 ³ 17)	2752.0	0.6 3	6.84 23	av E β =2345 89
(5.24×10 ³ 17)	2738.6	1.2 4	6.55 16	av E β =2351 89
(5.29×10 ³ 17)	2687.7	1.9 5	6.37 14	av E β =2375 89
(5.36×10 ³ 17)	2623.28	29.8 21	5.19 8	av E β =2406 89 $I\beta^-$: 30.0 30 (2003Lh01).
(5.37×10 ³ 17)	2611.3	1.0 4	6.67 19	av E β =2412 89
(5.38×10 ³ 17)	2598.42	2.7 5	6.25 11	av E β =2418 89
(5.42×10 ³ 17)	2562.8	0.6 3	6.91 23	av E β =2435 89
(5.46×10 ³ 17)	2520.19	7.0 13	5.86 11	av E β =2455 89
(5.53×10 ³ 17)	2446.8	1.5 5	6.55 16	av E β =2490 89
(5.58×10 ³ ‡ 17)	2398.5	0.5 2	7.05 19	av E β =2513 89
(5.66×10 ³ ‡ 17)	2316.1	0.5 4	7.1 4	av E β =2553 89
(5.69×10 ³ 17)	2290.0	1.1 3	6.74 14	av E β =2565 89
(5.76×10 ³ 17)	2215.8	0.8 3	6.91 18	av E β =2600 89
(5.80×10 ³ ‡ 17)	2184.03	3.6 14	6.26 18	av E β =2616 89
(5.89×10 ³ ‡ 17)	2090.34	0.7 7	7.0 5	av E β =2660 89 $I\beta^-$: 1.0 8 (2003Lh01).
(5.91×10 ³ ‡ 17)	2065.17	1.4 10	6.7 4	av E β =2672 89 $I\beta^-$: 1.7 11 (2003Lh01).
(6.00×10 ³ 17)	1983.72	1.7 6	6.65 17	av E β =2711 89 $I\beta^-$: 1.5 5 (2003Lh01).
(6.34×10 ³ ‡ 17)	1638.73	1.1 5	6.95 21	av E β =2876 89 $I\beta^-$: 0.9 5 (2003Lh01).
(6.35×10 ³ ‡ 17)	1630.69	<4	>8.4 ^{1u}	av E β =2865 89 $I\beta^-$: 1.0 25 (2003Lh01).
(6.48×10 ³ ‡ 17)	1500.53	2.2 22	6.7 5	av E β =2942 89
(6.66×10 ³ ‡ 17)	1319.91	2.0 9	6.79 21	av E β =3028 89
(6.97×10 ³ ‡ 17)	1011.66	<3	>6.7	av E β =3175 89 $I\beta^-$: 2.8 28.
(7.13×10 ³ ‡ 17)	852.39	<5	>6.5	av E β =3251 89 $I\beta^-$: 1.0 32 (2003Lh01).

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

$\gamma(^{114}\text{Pd})$

I γ normalization: $\Sigma(I(\gamma+ce)$ of γ 's to g.s.=100) with no feeding to 332.6 level.

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
103.2 2	1.8 5	2623.28	(6 ⁻)	2520.19	(6 ⁻)
159.4 3	0.4 2	1011.66	3 ⁺	852.39	4 ⁺
166.4 3	0.5 2	2789.35	(6,7 ⁻)	2623.28	(6 ⁻)

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$^{114}\text{Rh}\beta^-$ decay (1.85 s): $J=(7^-)$ 2003Lh01 (continued) $\gamma(^{114}\text{Pd})$ (continued)

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α^\ddagger
273.4 3	1.1 3	2623.28	(6 ⁻)	2349.68	(5 ⁻ ,6 ⁺)		
310.7 2	1.2 3	1630.69	5 ⁺	1319.91	4 ⁺		
317.0 2	28.8 22	1011.66	3 ⁺	694.62	2 ⁺	[M1,E2]	0.021 4
332.6 1	100	332.61	2 ⁺	0	0 ⁺	E2	0.0211
336.0 3	2.6 5	2520.19	(6 ⁻)	2184.03	(5 ⁻)		
362.0 2	27.9 26	694.62	2 ⁺	332.61	2 ⁺	[M1,E2]	0.0142
372.1 3	0.9 3	2892.3		2520.19	(6 ⁻)		
400.2 3	0.6 3	3138.78	(6 ⁻)	2738.6			
407.3 3	0.7 3	2927.5		2520.19	(6 ⁻)		
414.2 3	0.4 2	2598.42	(7 ⁻)	2184.03	(5 ⁻)		
426.5# 5	0.3 2	2065.17	(4 ⁻)	1638.73	(3 ⁻ ,4 ⁺)		
439.5 3	1.2 3	2623.28	(6 ⁻)	2184.03	(5 ⁻)		
441.0 3	1.9 4	3064.42	(6,7) ⁻	2623.28	(6 ⁻)		
451.7 3	1.0 3	2090.34	(4 ⁻ ,5 ⁺)	1638.73	(3 ⁻ ,4 ⁺)		
455.0 3	2.1 4	2520.19	(6 ⁻)	2065.17	(4 ⁻)		
459.8# 4	0.4 2	2090.34	(4 ⁻ ,5 ⁺)	1630.69	5 ⁺		
467.4 2	1.8 3	1319.91	4 ⁺	852.39	4 ⁺		
483.0 4	0.4 2	1983.72	6 ⁺	1500.53	6 ⁺		
503.7 4	0.4 2	2687.7	(6)	2184.03	(5 ⁻)		
504.9 4	0.5 2	3128.37	(6 ⁻)	2623.28	(6 ⁻)		
519.8 2	57.7 31	852.39	4 ⁺	332.61	2 ⁺		
540.1# 4	0.2 1	3138.78	(6 ⁻)	2598.42	(7 ⁻)		
544.0 3	2.5 5	3064.42	(6,7) ⁻	2520.19	(6 ⁻)		
550.5 4	0.5 2	2997.4		2446.8	(6 ⁺)		
557.8 4	0.5 2	3078.3	(6,7)	2520.19	(6 ⁻)		
558.2 2	5.7 5	2623.28	(6 ⁻)	2065.17	(4 ⁻)		
568.0 3	0.8 3	2752.0	(6,7) ⁻	2184.03	(5 ⁻)		
605.0 3	0.4 2	2789.35	(6,7) ⁻	2184.03	(5 ⁻)		
608.0 3	0.9 3	3128.37	(6 ⁻)	2520.19	(6 ⁻)		
618.2 5	0.5 2	3064.42	(6,7) ⁻	2446.8	(6 ⁺)		
619.0 2	39.7 22	1630.69	5 ⁺	1011.66	3 ⁺		
625.3 2	9.5 7	1319.91	4 ⁺	694.62	2 ⁺		
627.1 3	1.5 3	1638.73	(3 ⁻ ,4 ⁺)	1011.66	3 ⁺		
639.5 3	0.9 2	2623.28	(6 ⁻)	1983.72	6 ⁺		
648.1 2	35.7 19	1500.53	6 ⁺	852.39	4 ⁺		
659.3 2	1.4 3	2290.0	7 ⁺	1630.69	5 ⁺		
663.8 2	3.7 4	1983.72	6 ⁺	1319.91	4 ⁺		
679.0 2	26.2 13	1011.66	3 ⁺	332.61	2 ⁺		
681.2# 5	0.3 2	3128.37	(6 ⁻)	2446.8	(6 ⁺)		
694.7 3	12.0 10	694.62	2 ⁺	0	0 ⁺		
705.7 4	0.9 4	3055.4		2349.68	(5 ⁻ ,6 ⁺)		
711.0 4	0.7 2	2349.68	(5 ⁻ ,6 ⁺)	1638.73	(3 ⁻ ,4 ⁺)		
715.3 4	1.0 3	2215.8	8 ⁺	1500.53	6 ⁺		
718.9# 4	0.3 2	2349.68	(5 ⁻ ,6 ⁺)	1630.69	5 ⁺		
770.7 4	0.9 2	2090.34	(4 ⁻ ,5 ⁺)	1319.91	4 ⁺		
778.4 3	1.1 3	1630.69	5 ⁺	852.39	4 ⁺		
789.2 3	1.1 3	3138.78	(6 ⁻)	2349.68	(5 ⁻ ,6 ⁺)		
812.3 3	0.6 3	3128.37	(6 ⁻)	2316.1			
848.9 4	0.5 3	2349.68	(5 ⁻ ,6 ⁺)	1500.53	6 ⁺		
863.7 4	0.8 3	2184.03	(5 ⁻)	1319.91	4 ⁺		
888.2 4	0.8 3	2953.4	(6 ⁻)	2065.17	(4 ⁻)		
889.4 2	9.4 8	2520.19	(6 ⁻)	1630.69	5 ⁺		
898.0 4	0.6 2	2398.5		1500.53	6 ⁺		
907.7 4	0.8 4	2997.4		2090.34	(4 ⁻ ,5 ⁺)		

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$^{114}\text{Rh}\beta^-$ decay (1.85 s):J=(7⁻) 2003Lh01 (continued) $\gamma(^{114}\text{Pd})$ (continued)

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
944.2	3	1638.73	(3 ⁻ ,4 ⁺)	694.62	2 ⁺
944.4	2	3128.37	(6 ⁻)	2184.03	(5 ⁻)
992.6	2	2623.28	(6 ⁻)	1630.69	5 ⁺
1012.9 [#]	5	2997.4		1983.72	6 ⁺
1019.7	3	2520.19	(6 ⁻)	1500.53	6 ⁺
1029.9	4	2349.68	(5 ⁻ ,6 ⁺)	1319.91	4 ⁺
1048.4	4	3138.78	(6 ⁻)	2090.34	(4 ⁻ ,5 ⁺)
1053.5	2	2065.17	(4 ⁻)	1011.66	3 ⁺
1056.9	4	2687.7	(6)	1630.69	5 ⁺
1078.7	4	2090.34	(4 ⁻ ,5 ⁺)	1011.66	3 ⁺
1080.9	3	3064.42	(6,7) ⁻	1983.72	6 ⁺
1097.9	2	2598.42	(7 ⁻)	1500.53	6 ⁺
1122.6	2	2623.28	(6 ⁻)	1500.53	6 ⁺
1144.6	5	3128.37	(6 ⁻)	1983.72	6 ⁺
1187.3	3	2687.7	(6)	1500.53	6 ⁺
1213.1	4	2065.17	(4 ⁻)	852.39	4 ⁺
1238.0	3	2738.6		1500.53	6 ⁺
1242.9	5	2562.8	(6 ⁺)	1319.91	4 ⁺
1288.8	3	2789.35	(6,7) ⁻	1500.53	6 ⁺
1292.3	3	2792.8		1500.53	6 ⁺
1321.1	3	2821.6		1500.53	6 ⁺
1331.6	2	2184.03	(5 ⁻)	852.39	4 ⁺
1352.7	3	2853.2		1500.53	6 ⁺
1463.8	3	2316.1		852.39	4 ⁺
1468.6	4	3099.2	(6,7 ⁺)	1630.69	5 ⁺
1497.8	4	3128.37	(6 ⁻)	1630.69	5 ⁺
1508.0	4	3138.78	(6 ⁻)	1630.69	5 ⁺
1563.8	4	3064.42	(6,7) ⁻	1500.53	6 ⁺
1577.9	3	3078.3	(6,7)	1500.53	6 ⁺
1594.3	4	2446.8	(6 ⁺)	852.39	4 ⁺
1598.6	5	3099.2	(6,7 ⁺)	1500.53	6 ⁺
1628.0	3	3128.37	(6 ⁻)	1500.53	6 ⁺
1638.5	4	3138.78	(6 ⁻)	1500.53	6 ⁺
1661.4	4	3161.9		1500.53	6 ⁺
1758.9	3	2611.3	(6 ⁺)	852.39	4 ⁺
1923.4	4	3423.9		1500.53	6 ⁺

[†] For absolute intensity per 100 decays, multiply by 0.80 3.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

[#] Placement of transition in the level scheme is uncertain.

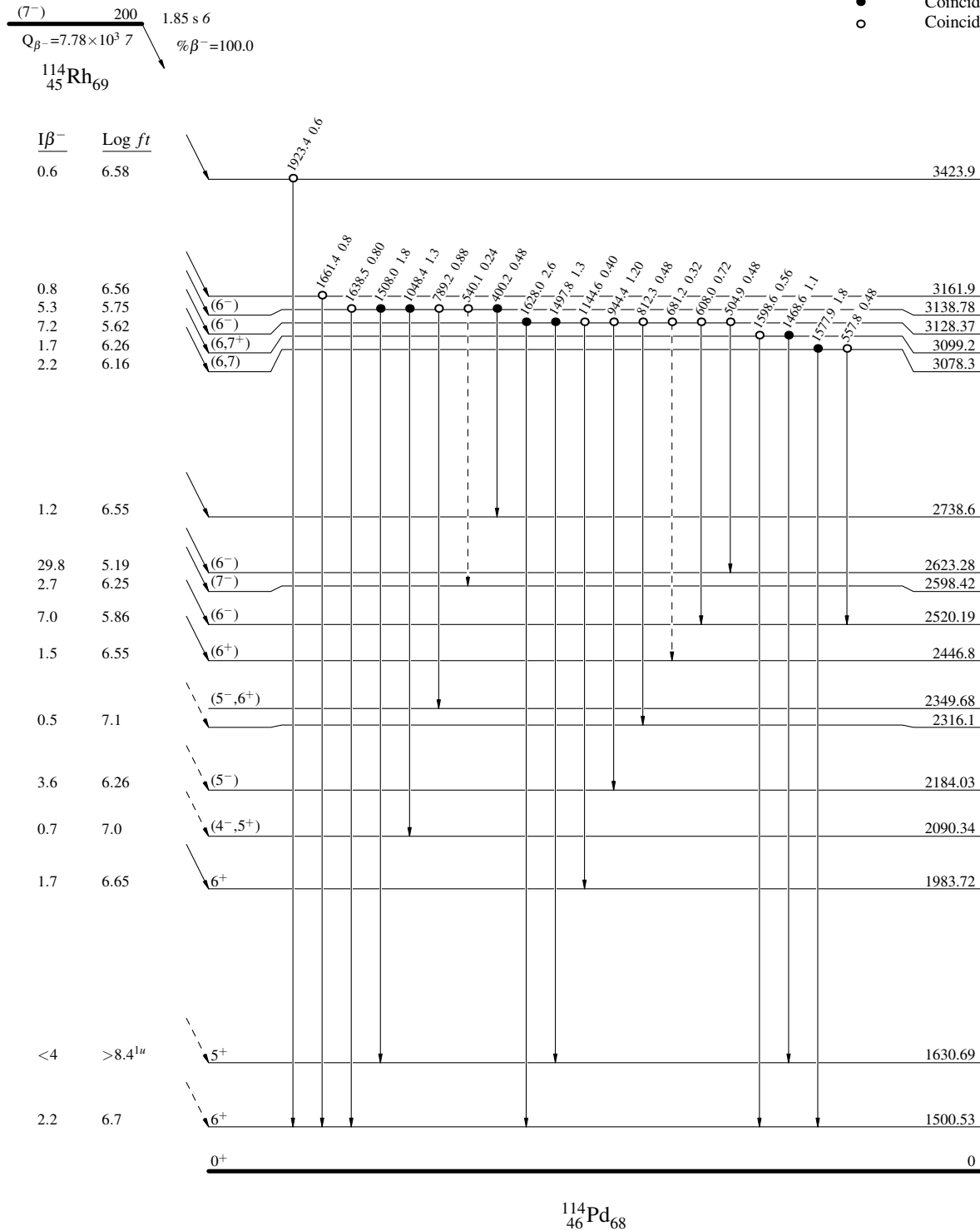
$^{114}\text{Rh } \beta^- \text{ decay (1.85 s):J}=(7^-) \quad 2003\text{Lh01}$

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - → γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)



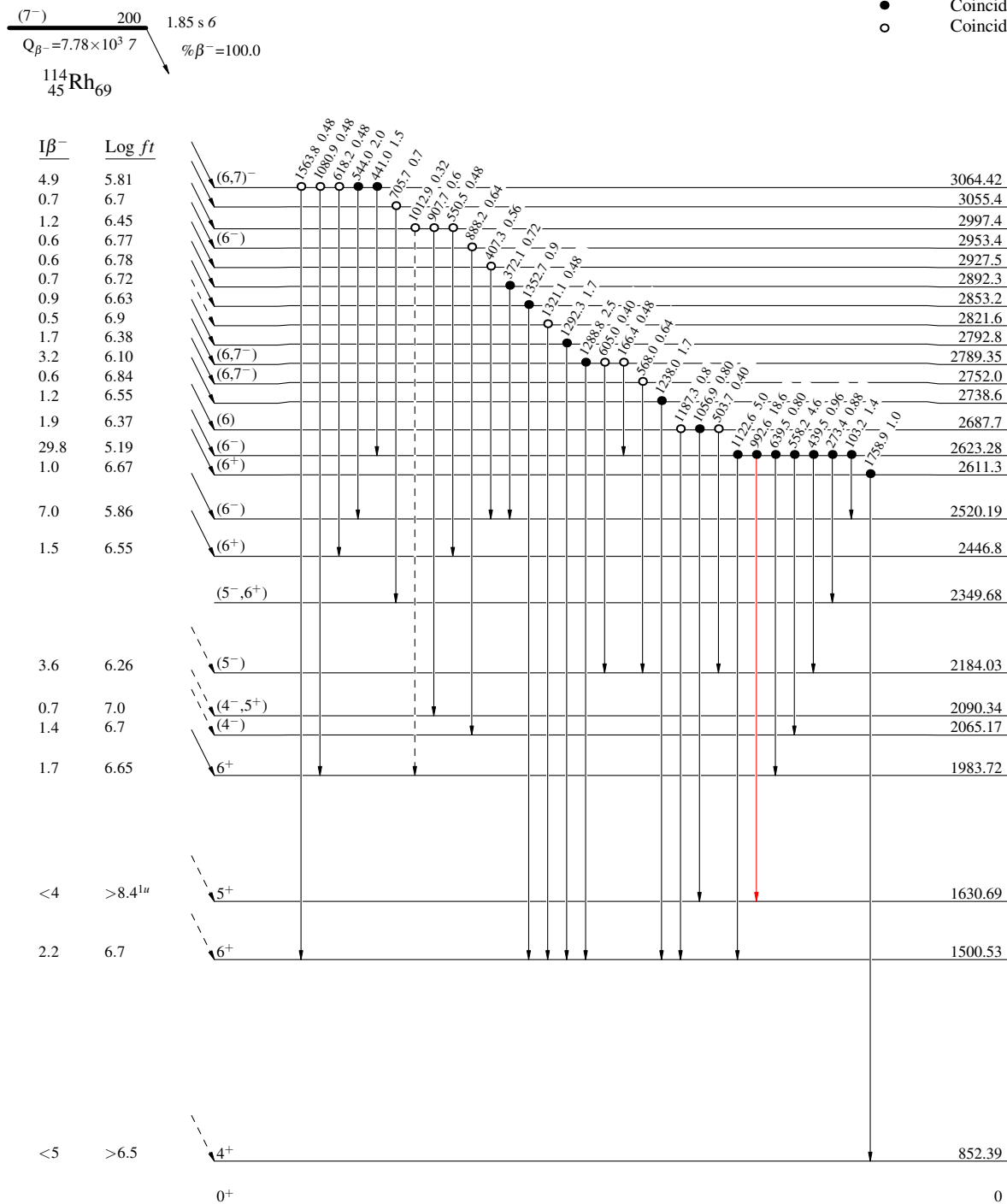
$^{114}\text{Rh } \beta^- \text{ decay (1.85 s):J}=(7^-) \quad 2003\text{Lh01}$

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)



$^{114}_{46}\text{Pd}_{68}$

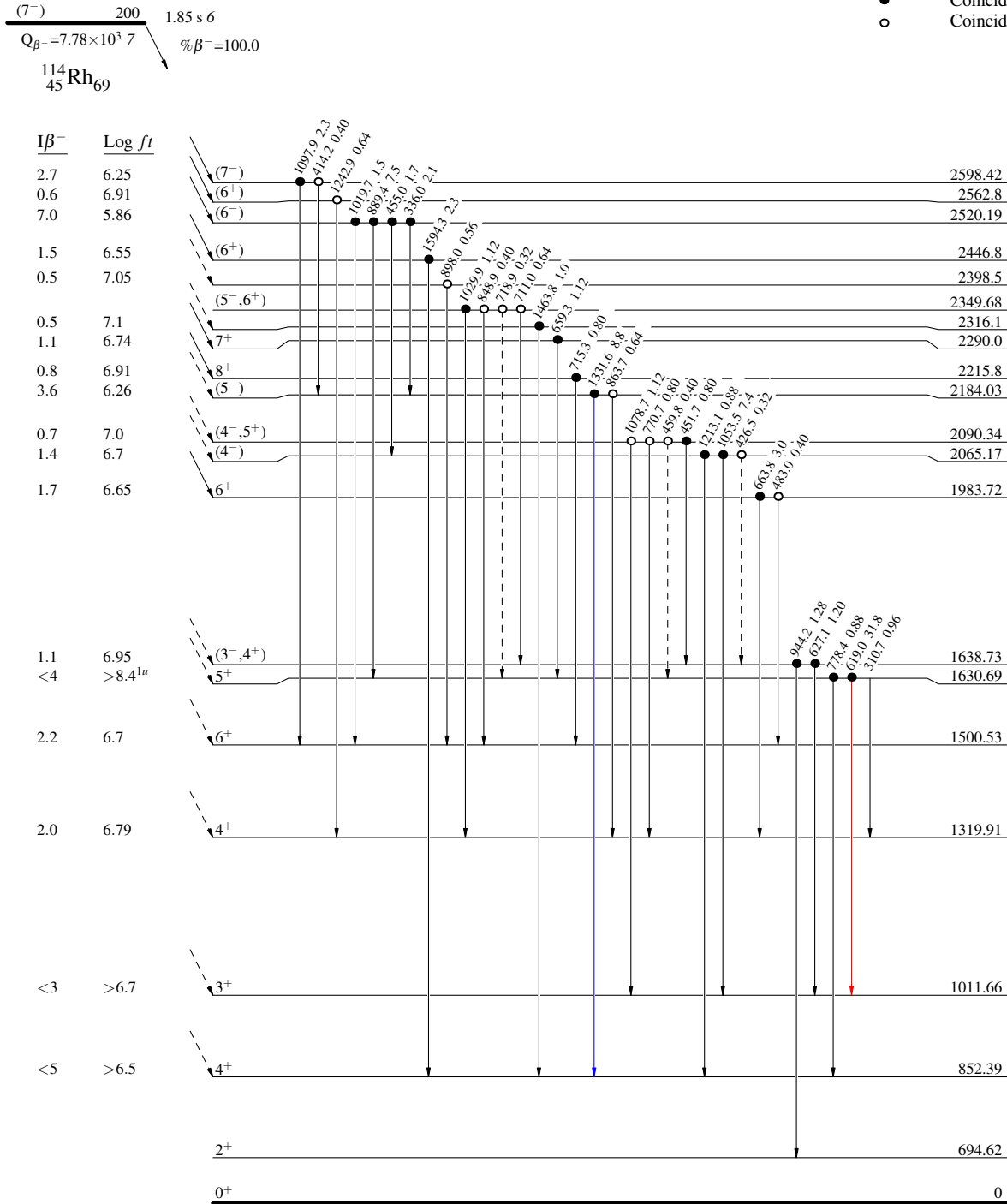
¹¹⁴Rh β⁻ decay (1.85 s):J=(7⁻) 2003Lh01

Decay Scheme (continued)

Intensities: I_(γ+ce) per 100 parent decays

Legend

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}
- - - γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)



¹¹⁴Pd₆₈

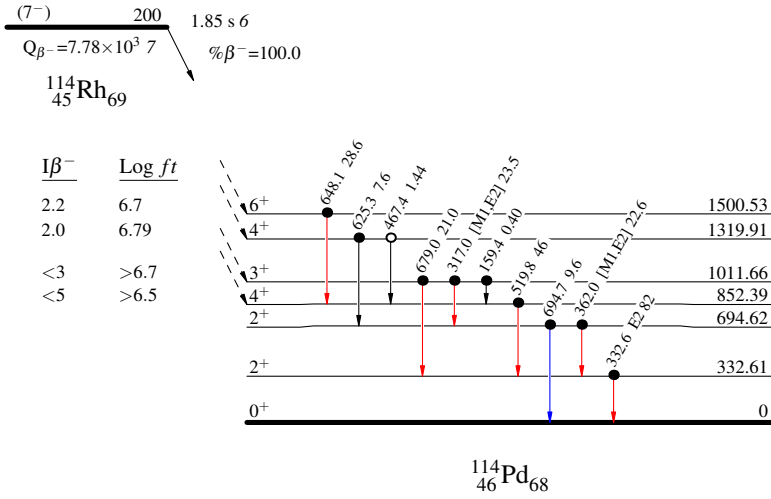
^{114}Rh β^- decay (1.85 s):J=(7⁻) 2003Lh01

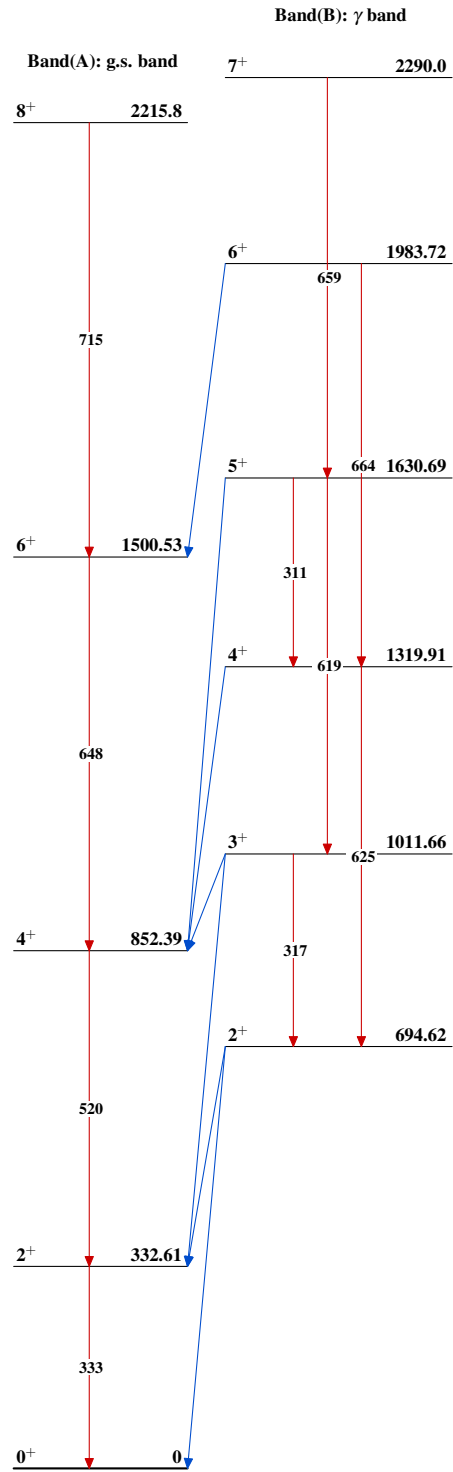
Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- Coincidence
- Coincidence (Uncertain)



$^{114}\text{Rh} \beta^-$ decay (1.85 s); J=(7⁻) 2003Lh01 $^{114}_{46}\text{Pd}_{68}$