^{102}Rh ε decay (207.3 d)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110, 1745 (2009)	31-Dec-2008

Parent: ^{102}Rh: E=0.0; J^π=(1$^-$,2$^-$); $T_{1/2}$=207.3 d *17*; Q(ε)=2323 *5*; %ε+%$β^+$ decay=78 *5*

Because of the many close-lying doublets, the internal conversion data of 1961Bo35, 1961Hi06 and 1968Ad02 are not included.

Coincidence measurements by 1969Ko24, 1970Ta03 and 1971Ta01 are summarized on the decay scheme.

Absolute intensities were calculated from Iβ$^-$(g.s.):Iβ$^+$(g.s.):Iβ$^+$(475)=100.0 *15*:54.6 *10*:21.2 *5*, ε/β$^+$(g.s.)=1.69 *4*, ε/β$^+$(475)=7.80 *25*. If the g.s. transition is first-forbidden unique, as would follow from the J^π=2$^-$ assignment of 1975Sc09 for the 207.3-d ^{102}Rh isomer, the intensities will have to be recalculated using ε/β$^+$(g.s.)=5.89.

^{102}Ru Levels

E(level)‡	Jπ†	$T_{1/2}$	Comments
0	0$^+$		
475.07 *4*	2$^+$	18.4 ps *3*	$T_{1/2}$: Adopted value. 12.2 ps *20* from γγ(t) (1963De21).
943.67 *5*	0$^+$		Jπ: (469)(475)(θ) is consistent with J(Q)2(Q)0 for J(944 level)=0, mult. (469γ)=E2 (1970Si13).
1103.14 *5*	2$^+$		
1106.37 *6*	4$^+$		
1521.66 *6*	3$^+$		
1580.55 *7*	2$^+$		Jπ: (1106)(475)(θ) is consistent with J(d,Q)2(Q)0 for J(1581 level)=2 or 3. Not consistent with J=1 (1970Si13).
1837.10 *9*	0$^+$		Jπ: (1362)(475)(θ) is consistent with J(Q)2(Q)0 for J(1837 level)=0, mult. (1362γ)=E2 (1970Si13).
2036.99 *13*	2$^+$		Jπ: (1562)(475)(θ) is consistent with J(d,Q)2(Q)0 for J(8037 level)=2 and δ(1562γ)=−1.9 *4*. Not consistent with J=1 or 3 for any δ (1970Si13).
2044.2 *3*	3$^-$		
2261.23 *6*	2$^-$		Jπ: (1152)(1103)(θ) is consistent with J(d,Q)2(Q)0 for J(2261 level)=2 and δ(1158γ)=−0.25 *5*. Not consistent with J=1 or 3. For additional γγ(θ) data, see 1970Si13. Jπ: the parity is obtained from α(K)exp measurements of 1993Fa11.

† From Adopted Levels.

‡ From a least-squares procedure using observed gammas.

ε,β$^+$ radiations

E(decay)	E(level)	Iβ$^+$ ‡	Iε‡	Log *ft*	I(ε+β$^+$)†‡	Comments
(62 *5*)	2261.23		1.8 *1*	6.7 *4*	1.8 *1*	εK= 0.78 *7*; εL= 0.17 *5*; εM+= 0.044 *14*
(286 *5*)	2036.99		0.23 *5*	9.01 *12*	0.23 *5*	εK= 0.8536 *14*; εL= 0.1181 *11*; εM+= 0.0282 *3*
(486 *5*)	1837.10		0.51 *6*	9.13 *7*	0.51 *6*	εK= 0.8605; εL= 0.1128 *4*; εM+= 0.02676 *10*
(801 *5*)	1521.66		≤0.17	≥10.0	≤0.17	εK= 0.8642; εL= 0.10986 *12*; εM+= 0.02596 *4*
(1217 *5*)	1106.37		≤0.10	≥10.6	≤0.10	εK= 0.8656; εL= 0.1083; εM+= 0.02553
(1220 *5*)	1103.14		6.6 *4*	8.83 *4*	6.6 *4*	εK= 0.8656; εL= 0.1083; εM+= 0.02553
(1379 *5*)	943.67	0.018 *5*	2.68 *20*	9.32 *4*	2.70 *20*	av Eβ= 170 *9*; εK= 0.8609 *13*; εL= 0.10730 *21*; εM+= 0.02529 *5*
1847 *11*	475.07	4.2 *5*	30.8 *18*	8.52 *3*	35.0 *19*	av Eβ= 372 *10*; εK= 0.764 *8*; εL= 0.0946 *11*; εM+= 0.02227 *24* E(decay): from Eβ=825 *11*; weighted average of 830 *15* (1963Bo17) and 820 *15* (1961Hi06).
2321 *7*	0	10.5 *5*	17.2 *7*	8.972 *23*	29 *1*	av Eβ= 582 *10*; εK= 0.539 *11*; εL= 0.0664 *14*; εM+= 0.0156 *4* E(decay): from Eβ=1299 *7*; weighted average of 1303 *10* (1963Bo17) and 1295 *10* (1961Hi06). β-ray does not have first-forbidden unique shape (see also

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^{102}Rh ε decay (207.3 d) (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Comments
		1969Ko24).
		Iβ+: from 1969Ge02 based on Iβ+(g.s.)/Iβ−(g.s.) in ^{102}Rh ($T_{1/2}$=207 d) 10.

† From γ-intensity balance at each level, except for the g.s.
‡ Absolute intensity per 100 decays.

γ(^{102}Ru)

Iγ normalization: Normalization based on %ε+%β+=78 *5* and %ε+%β+ to g.s. of 29 *1*.

E_γ†	I_γ†#	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	$I_{(\gamma+ce)}$#	Comments
216.9 *3*	0.01 *1*	2261.23	2−	2044.2	3−				E_γ: observed by 1970Ta03 only. I_γ: deduced from 1971Ta01.
224.9@ *4*	0.05 *3*	2261.23	2−	2036.99	2+				E_γ: observed by 1969Ko24 only.
256.8 *4*	0.02 *1*	1837.10	0+	1580.55	2+				E_γ: observed by 1969Ko24 and 1970Hu02.
415.25 *15*	0.03 *2*	1521.66	3+	1106.37	4+				
418.52 *18*	0.12 *2*	1521.66	3+	1103.14	2+	E2+M1	−7.2 *10*		
456.42 *15*	0.08 *2*	2036.99	2+	1580.55	2+				
468.58 *4*	2.9 *2*	943.67	0+	475.07	2+	E2			α(K)exp=5.9×10^{-3} *7* (1981Ko23); α(K)=5.63×10^{-3}
475.06 *4*	46 *3*	475.07	2+	0	0+	E2			
628.05 *5*	4.5 *4*	1103.14	2+	475.07	2+	E2(+M1)+E0	−60 *20*		α: from 1986Gi04. Mult.: from α(K)exp=2.58×10^{-3} *11* (1993Fa11).
631.29 *5*	0.10 *3*	1106.37	4+	475.07	2+	E2			Mult.: from α(K)exp=6.27×10^{-4} *30* (1993Fa11).
636.81 *10*	0.23 *3*	1580.55	2+	943.67	0+				
680.66 *5*	0.58 *4*	2261.23	2−	1580.55	2+	E1			Mult.: from α(K)exp=6.8×10^{-4} *24* (1993Fa11).
733.93 *8*	0.10 *2*	1837.10	0+	1103.14	2+				
739.58 *7*	0.53 *8*	2261.23	2−	1521.66	3+	(E1+M2)	−0.1 *1*		
930.5 *3*	0.03 *2*	2036.99	2+	1106.37	4+				
933.2@ *4*	0.02 *1*	2036.99	2+	1103.14	2+				E_γ: observed by 1969Ko24 only.
943.48		943.67	0+	0	0+	E0		0.0031 *5*	ρ(E0)=0.12 *1* (1986Gi04). Other: 0.092 (1981Ko23). B(E0)/B(E2)=0.013 *2* (1986Gi04,1981Ko23). $I_{(\gamma+ce)}$: calculated by evaluator from Ice values of 1986Gi04. E_γ: completely converted γ-transition observed by 1981Ko23, 1986Gi04.
1046.59 *7*	0.43 *3*	1521.66	3+	475.07	2+	E2+M1	−7.0 *6*		
1103.16 *6*	2.9 *1*	1103.14	2+	0	0+	E2			B(E0)/B(E2)<0.032 (1986Gi04). Mult.: from α(K)exp=2.58×10^{-3} *11* (1993Fa11).
1105.7 *3*	0.39 *3*	1580.55	2+	475.07	2+	E2+M1+E0	+0.25 *3*		Mult.: from α(K)exp=8.20×10^{-4} *54* (1993Fa11).
1158.10 *6*	0.58 *4*	2261.23	2−	1103.14	2+	E1			Mult.: from α(K)exp=2.64×10^{-4} *25* (1993Fa11).

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^{102}Rh ε decay (207.3 d) (continued)

γ(^{102}Ru) (continued)

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
1362.1 *2*	0.39 *5*	1837.10	0^+	475.07	2^+	E2		ce(K)(1837)/ce(K)(1362)≤3.7×10^{-2}. B(E0)/B(E2)<0.019 (1986Gi04).
1562.2 *4*	0.11 *3*	2036.99	2^+	475.07	2^+	E2+M1+E0	−1.9 *4*	Mult.: from α(K)exp=6.8×10^{-4} *16* (1993Fa11).
1568.7 *6*	0.01 *1*	2044.2	3^-	475.07	2^+			
1580.5 *3*	0.05 *1*	1580.55	2^+	0	0^+			
1786.4 *4*	0.01 *1*	2261.23	2^-	475.07	2^+			
2037.0 *3*	0.03 *2*	2036.99	2^+	0	0^+			
2044.1[@] *4*	0.001 *1*	2044.2	3^-	0	0^+			E_γ: observed by 1971Ta01 only.
2261.3 *4*	0.02 *2*	2261.23	2^-	0	0^+			

[†] γ-ray energies and intensities are primarily from 1969Ge02, unless noted otherwise. Other references: 1969Ko24, 1970Hu02, 1970Ta03, 1971Ta01, 1981Ko23.
[‡] From γγ(θ) results of 1970Si13. See also 1968Ad02. Mixed transitions have multipolarity=E2+M1 from known J^π.
[#] Absolute intensity per 100 decays.
[@] Placement of transition in the level scheme is uncertain.

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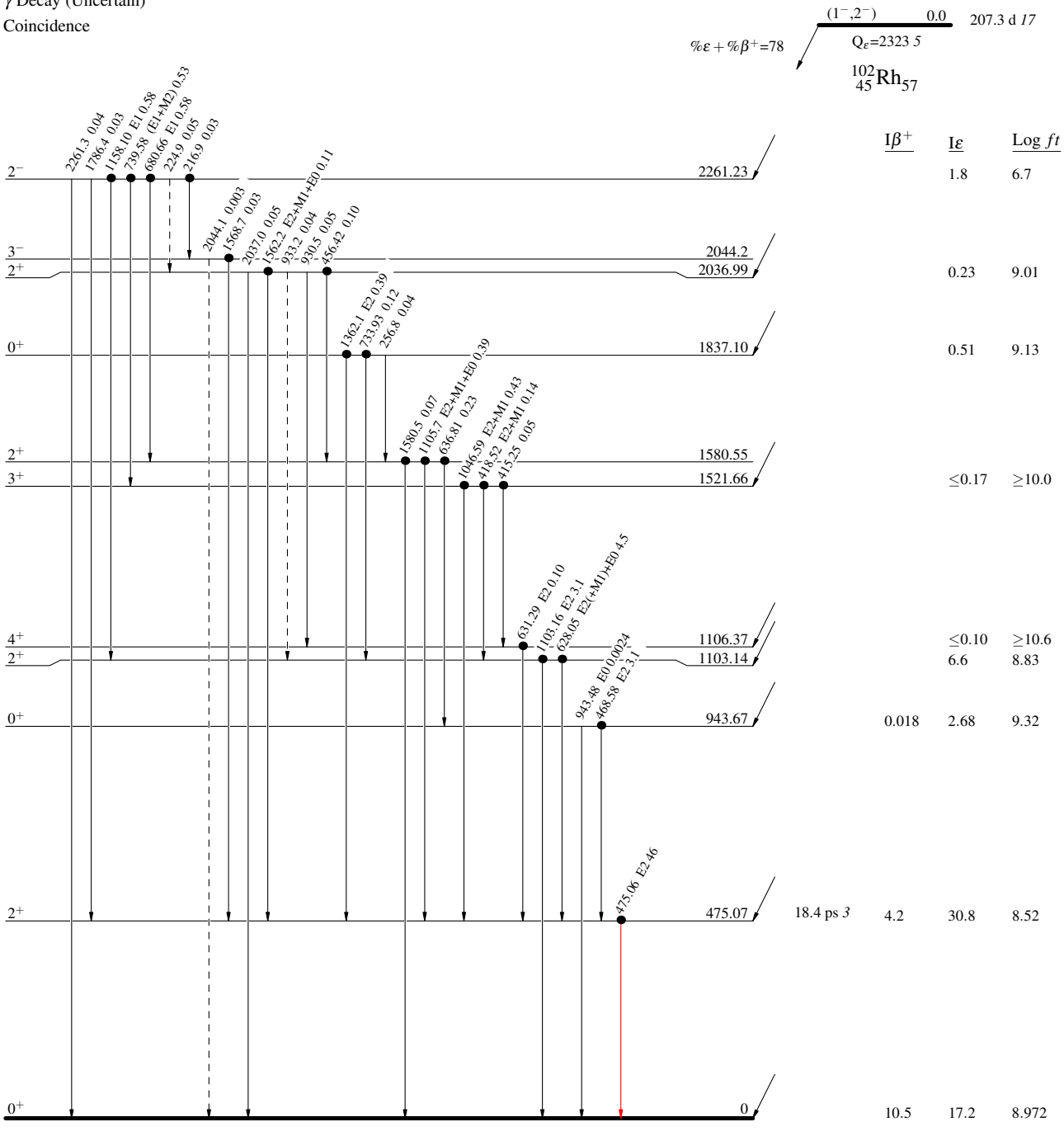
Decay Scheme

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



$^{102}_{44}Ru_{58}$