^{100}Rh ε decay (4.6 min) 1980Ba59,1978Ki07,1974Si18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 172, 1 (2021)	31-Jan-2021

Parent: ^{100}Rh: E=107.59 *20*; $J^\pi=(5^+)$; $T_{1/2}$=4.6 min *2*; Q(ε)=3636 *18*; %ε+%$β^+$ decay≈1.7

^{100}Rh-E,J^π,$T_{1/2}$: From ^{100}Rh Adopted Levels.

^{100}Rh-Q(ε): From 2017Wa10.

^{100}Rh-%ε+%$β^+$ decay: from decay of ^{100}Rh (4.6 min) and growth of ^{100}Rh (20.8 h) (1980Ba59). From 1986Du04, deduced branching=3.5%. Others: 1978Ki07, 1974Si18.

1980Ba59, 1978Ki07, 1974Si18: Measured γ.

Others: 1986Du04, 1982MaZP.

$T_{1/2}$(^{100}Rh isomer): 1974Si18.

Total decay energy deposit of 70 keV calculated by RADLIST code is in agreement with expected value of 64 keV.

^{100}Ru Levels

E(level)†	J^π‡	Comments
0.0	0^+	
539.6 *4*	2^+	
1226.7 *5*	4^+	
1362.1 *4*	2^+	
1881.3 *7*	3^+	
2063.1 *5*	4^+	
2075.3? *7*		E(level): this level is questionable (see comment for 1535.6γ).
2075.7? *12*	6^+	Level suggested by evaluators from the Adopted Levels.
2313.6 *5*	$(3^-,4^+)$	E(level): level considered as questionable by 2000Ge01 since none of the three transitions seen in their (α,2nγ) experiment.
2324.9 *6*		E(level): level considered as questionable by 2000Ge01 since 262.3γ is placed from a 2968 level and 1097.8γ is not seen in their (α,2nγ) experiment.
2367.3 *6*	4^+	

† From least-squares fit to Eγ data, assuming Δ(Eγ)=0.5 keV for each γ ray.

‡ From the Adopted Levels.

ε,$β^+$ radiations

1362 level: from γ intensity balance, %ε+$β^+$=−0.027 *14*. This non-physical result may be due to poor knowledge of γ-ray intensities from the decay of the 4.6 min ^{100}Rh.

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*†	I(ε+β+)†‡	Comments
(1376 *18*)	2367.3	≈0.0025	≈0.46	≈5.3	≈0.46	av Eβ=162.8 *78*; εK=0.8618 *10*; εL=0.10744 *16*; εM+=0.02532 *4*
(1419 *18*)	2324.9	≈0.00066	≈0.076	≈6.1	≈0.077	av Eβ=181.1 *78*; εK=0.8592 *14*; εL=0.10704 *21*; εM+=0.02523 *5*
(1430 *18*)	2313.6	≈0.00053	≈0.055	≈6.2	≈0.056	av Eβ=186.0 *78*; εK=0.8584 *15*; εL=0.10691 *22*; εM+=0.02520 *6*
(1668# *18*)	2075.7?	≈0.00051	≈0.0095	≈7.1	≈0.010	av Eβ=288.5 *78*; εK=0.823 *5*; εL=0.1021 *6*; εM+=0.02405 *14*
(1668# *18*)	2075.3?	≈0.016	≈0.29	≈5.6	≈0.31	av Eβ=288.7 *78*; εK=0.823 *5*; εL=0.1021 *6*; εM+=0.02405 *14*
(1680 *18*)	2063.1	≈0.004	≈0.07	≈6.3	≈0.07	av Eβ=293.9 *78*; εK=0.820 *5*; εL=0.1017 *6*; εM+=0.02396 *14*

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ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*†	I(ε+β+)†‡	Comments
(1862# *18*)	1881.3	≈0.004	≈0.03	≈6.8	≈0.03	av Eβ=372.9 *79*; εK=0.763 *7*; εL=0.0945 *9*; εM+=0.02225 *21* Expected β+ε feeding is zero for a ΔJ=(2), Δπ=(no) β transition.
(2517 *18*)	1226.7	≈0.42	≈0.45	≈5.8	≈0.87	av Eβ=663.3 *81*; εK=0.450 *9*; εL=0.0554 *11*; εM+=0.01305 *25*

† Due to poor knowledge of (ε+β+)/IT ratio, the feedings and log *ft* values are given as approximate values.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{100}Ru)

Iγ normalization: from I(γ+ce)(540γ+1362γ)=100. The branching through this decay is ≈1.7% (1980Ba59). No direct β+,ε feeding expected to g.s.

E_γ†	I_γ&	E_i(level)	J_i^π	E_f	J_f^π	Mult.@	δ@	α[a]	Comments
262.3	3.7 *6*	2324.9		2063.1	4+	[D,E2]		0.026 *16*	
539.6	100 *9*	539.6	2+	0.0	0+	E2		0.00428	α(K)=0.00373 *6*; α(L)=0.000456 *7*; α(M)=8.37×10−5 *12* α(N)=1.339×10−5 *19*; α(O)=6.52×10−7 *10*
686.9	60	1226.7	4+	539.6	2+	E2		0.00221	α(K)=0.00193 *3*; α(L)=0.000230 *4*; α(M)=4.22×10−5 *6* α(N)=6.78×10−6 *10*; α(O)=3.41×10−7 *5*
701.2	3.3 *3*	2063.1	4+	1362.1	2+	E2			
822.5	1.2 *6*	1362.1	2+	539.6	2+	E2+M1	+3.7 *3*		
836.4	3.1 *3*	2063.1	4+	1226.7	4+	M1+E2	+1.73 *21*		
849‡b	≤0.6	2075.7?	6+	1226.7	4+	E2			
951.5	0.5 *3*	2313.6	(3−,4+)	1362.1	2+				
1087.1	0.7 *3*	2313.6	(3−,4+)	1226.7	4+				
1097.8	0.9 *3*	2324.9		1226.7	4+				
1140.7	3.6 *3*	2367.3	4+	1226.7	4+				
1341.6	1.8 *7*	1881.3	3+	539.6	2+	M1+E2	+5.7 *5*		
1362.1	1.0 *3*	1362.1	2+	0.0	0+	E2			
x1380.5	1.8 *3*								
1523.7	1.6 *2*	2063.1	4+	539.6	2+	E2			
1535.6#b	19 *1*	2075.3?		539.6	2+				
1773.9	2.1 *3*	2313.6	(3−,4+)	539.6	2+				
1827.5	24 *2*	2367.3	4+	539.6	2+	E2			

† From 1980Ba59, Δ(Eγ) not given by the authors, 0.5 keV assumed by the evaluators for fitting purpose.
‡ Placement from the Adopted Gammas.
# 2000Ge01 point out that a γ ray close to this energy in (α,2nγ) experiment shows coincidence in 687γ gate, suggesting that 1536γ may be from a level near 2762 keV.
@ From the Adopted Gammas.
& For absolute intensity per 100 decays, multiply by ≈0.017.

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γ(^{100}Ru) (continued)

[a] 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.
[b] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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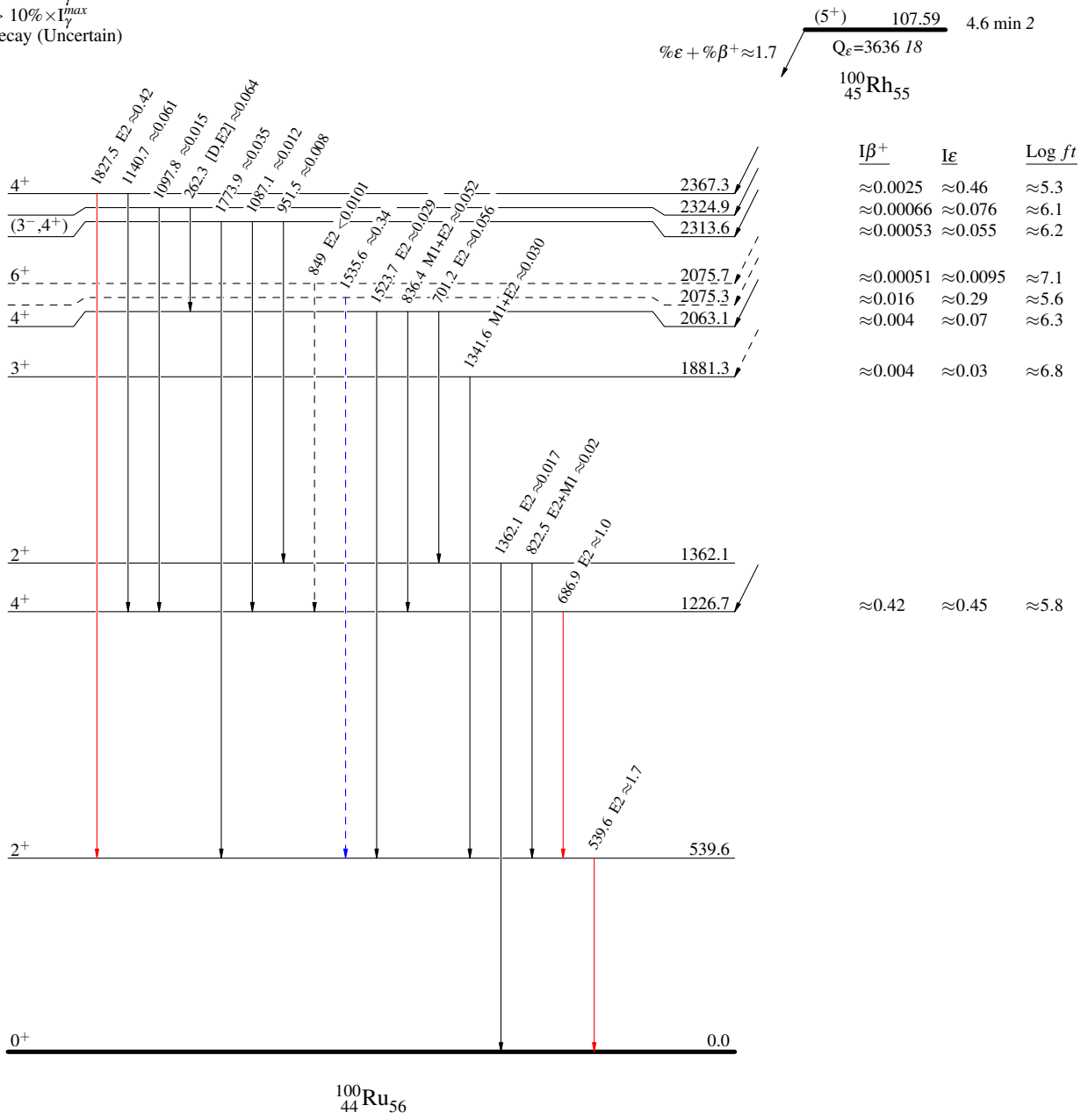
Decay Scheme

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)



$^{100}_{44}Ru_{56}$