

¹¹⁵Ru β⁻ decay 2011Ri07,2010Ku01,2007Ku06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 113, 2391 (2012)	1-Sep-2012

Parent: ¹¹⁵Ru: E=0; J^π=(3/2⁺); T_{1/2}=318 ms 19; Q(β⁻)=8165 12; %β⁻ decay=100.0

¹¹⁵Ru-T_{1/2}: From measurement in 2010Ku25, including also the value of 270 ms 38 in 2010Ku01. Note other half-lives have been reported such as 740 ms 80 (1992Ay02: 405 ms +96-80 (2006Mo07).

¹¹⁵Ru-Q(β⁻): Quoted by 2011Ri07 and 2007Ku06 from Penning-trap measurement (2007Ha20: Others:8040 89 (2011AuZZ), 7780 100 (2003Au03).

¹¹⁵Ru produced in 25-MeV proton-induced fission of uranium followed by mass separation at IGISOL-jyfltrap facility. The γ rays were detected by three Ge detectors, a planar Ge detector (loax) and a plastic scintillator for β radiation. Measured E_γ, I_γ, γγ, βγ, (x ray)γ coin.

Level scheme is from 2011Ri07. Levels up to 696 were also reported in 2007Ku06, and up to 1258 in 2010Ku01.

All data are from 2011Ri07, unless otherwise stated.

¹¹⁵Rh Levels

E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	E(level) [†]
0.0	(7/2 ⁺)	617.6 2	(7/2 ⁺)	1010.6 3	1474.4 4
213.2? 2	(9/2 ⁺)	695.9 3	(3/2 ⁺)	1117.6 3	1684.6 5
292.4 2	(3/2 ⁺)	730.8 2	(1/2 ⁺)	1258.7 4	2050.4 4
372.5 2	(5/2 ⁺)	935.0 3	(5/2 ⁺)	1398.3 6	2249.4 4
499.5 2	(3/2 ⁺)	1002.7 3		1452.4 3	2280.1 6

[†] From least-squares fit to E_γ data in 2011Ri07.

[‡] From systematics of neighboring nuclides (2011Ri07).

β⁻ radiations

By comparison the total β feeding to states in ¹¹⁵Rh with that to β feeding of states in ¹¹⁵Pd in ¹¹⁵Ru → ¹¹⁵Rh → ¹¹⁵Pd decay chain, 2011Ri07 find that 6% 6 of the β feeding from ¹¹⁵Ru is unaccounted. One possibility is that the 76-ms isomer found in 2010Ku25 partly decays by β decay which may also explain small β feeding of (7/2⁺) state at 617.6.

E(decay)	E(level)	Iβ ⁻ [‡]	Log ft [†]	Comments
(5885 12)	2280.1	2.1 3	5.7 1	av Eβ=2628.2 58
(5916 12)	2249.4	3.7 6	5.5 1	av Eβ=2642.8 58
(6115 12)	2050.4	5.4 6	5.4 1	av Eβ=2737.9 58
(6480 12)	1684.6	3.3 4	5.7 1	av Eβ=2912.8 58
(6691 12)	1474.4	2.3 5	5.9 1	av Eβ=3013.2 58
(6713 12)	1452.4	4.8 12	5.6 1	av Eβ=3023.7 58
(6767 12)	1398.3	2.4 10	5.9 2	av Eβ=3049.6 58
(6906 12)	1258.7	1.9 2	6.1 1	av Eβ=3116.3 58
(7047 12)	1117.6	1.5 2	6.2 1	av Eβ=3183.7 58
(7154 12)	1010.6	0.5 5	6.7 5	av Eβ=3234.8 58
(7162 12)	1002.7	4.6 2	5.8 1	av Eβ=3238.5 58
(7230 12)	935.0	5.0 6	5.8 1	av Eβ=3270.9 58
(7434 12)	730.8	7 2	5.7 2	av Eβ=3368.3 58
(7469 12)	695.9	7.4 6	5.6 1	av Eβ=3385.0 58
(7547 12)	617.6	2.4 4	6.2 1	av Eβ=3422.4 58
(7666 12)	499.5	9.4 13	5.6 1	av Eβ=3478.7 58
(7793 12)	372.5	15 4	5.4 2	av Eβ=3539.3 58
(7873 12)	292.4	15 6	5.4 2	av Eβ=3577.5 58

Continued on next page (footnotes at end of table)

¹¹⁵Ru β⁻ decay [2011Ri07](#),[2010Ku01](#),[2007Ku06](#) (continued)

β⁻ radiations (continued)

† [2011Ri07](#) state that all log *ft* values should be considered as lower limits since there is possibility of missing high-energy low-intensity γ rays from high-lying levels allowed by large Q(β) window.

‡ Absolute intensity per 100 decays.

γ(¹¹⁵Rh)

I_γ normalization: deduced from the decay scheme given in [2011Ri07](#). No delayed neutron branch was seen in [2011Ri07](#).

A 61.7-keV γ ray is seen in singles γ spectrum in [2010Ku01](#), but not in β-gated spectrum. Its half-life was measured as 76 ms *14*. In a further study, [2010Ku25](#) assigned this an isomer in ¹¹⁵Ru.

<u>E_γ</u> [†]	<u>I_γ</u> ^{†&}	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>α</u> [@]	<u>Comments</u>
80.1 2	13.0 5	372.5	(5/2 ⁺)	292.4	(3/2 ⁺)	M1+E2	1.0 5	α: estimated from α(K)exp=0.9 4 (2011Ri07).
158.9 ^{‡a} 9		372.5	(5/2 ⁺)	213.2?	(9/2 ⁺)			
196.5 2	10.3 5	695.9	(3/2 ⁺)	499.5	(3/2 ⁺)	[M1+E2]	0.09 4	
207.0 2	30.6 10	499.5	(3/2 ⁺)	292.4	(3/2 ⁺)	[M1+E2]	0.07 3	
213.2 ^a 2		213.2?	(9/2 ⁺)	0.0	(7/2 ⁺)			E _γ : seen in β-gated singles γ spectrum, in weak coin with 158.9γ and 404.2γ.
231.4 2	2.3 8	730.8	(1/2 ⁺)	499.5	(3/2 ⁺)	[M1+E2]	0.052 17	
239.2 2	2.2 [#] 5	935.0	(5/2 ⁺)	695.9	(3/2 ⁺)	[M1+E2]	0.047 15	
245.1 2	2.9 4	617.6	(7/2 ⁺)	372.5	(5/2 ⁺)	[M1+E2]	0.043 13	
292.5 2	100 4	292.4	(3/2 ⁺)	0.0	(7/2 ⁺)	[E2]	0.0307	E _γ : this γ ray was identified in 1992Ay02 : Phys Rev Lett 69, 1167.
358.4 2	2.9 6	730.8	(1/2 ⁺)	372.5	(5/2 ⁺)	[E2]	0.0157	
372.5 2	9.9 14	372.5	(5/2 ⁺)	0.0	(7/2 ⁺)	[M1+E2]	0.012 2	I _γ : contribution from a 372.9γ in ¹¹⁵ Ag decay has been subtracted.
404.2 ^{‡a} 6		617.6	(7/2 ⁺)	213.2?	(9/2 ⁺)			
435.5 2	3.8 [#] 5	935.0	(5/2 ⁺)	499.5	(3/2 ⁺)	[M1+E2]	0.0078 8	
438.3 2	3.2 [#] 23	730.8	(1/2 ⁺)	292.4	(3/2 ⁺)	[M1+E2]	0.0077 7	
441.9 2	4.6 [#] 10	1452.4		1010.6				
618.1 2	1.8 2	1117.6		499.5	(3/2 ⁺)			
630.0 3	0.4 1	1002.7		372.5	(5/2 ⁺)			
638.3 3	3.8 2	1010.6		372.5	(5/2 ⁺)			
710.4 3	6.9 3	1002.7		292.4	(3/2 ⁺)			
718.3 3	3.7 2	1010.6		292.4	(3/2 ⁺)			
966.3 3	2.4 3	1258.7		292.4	(3/2 ⁺)			
974.9 ^a 3	0.9 [#] 2	1474.4		499.5	(3/2 ⁺)			
1025.8 6	2.0 10	1398.3		372.5	(5/2 ⁺)			
1040.1 4	2.8 6	2050.4		1010.6				
1079.4 5	1.3 10	1452.4		372.5	(5/2 ⁺)			
1105.9 9	0.9 5	1398.3		292.4	(3/2 ⁺)			
1182.2 5	1.9 [#] 5	1474.4		292.4	(3/2 ⁺)			
1246.8 9	1.7 4	2249.4		1002.7				
1392.2 4	4.1 4	1684.6		292.4	(3/2 ⁺)			
1677.3 5	2.5 3	2050.4		372.5	(5/2 ⁺)			
1758.2 12	1.3 4	2050.4		292.4	(3/2 ⁺)			
1780.6 5	2.6 4	2280.1		499.5	(3/2 ⁺)			
1876.7 ^a 6	1.4 4	2249.4		372.5	(5/2 ⁺)			
2249.4 ^a 5	1.4 5	2249.4		0.0	(7/2 ⁺)			

† From [2011Ri07](#). Intensities are from β-gated singles γ spectrum, unless otherwise stated.

^{115}Ru β^- decay [2011Ri07](#), [2010Ku01](#), [2007Ku06](#) (continued)

$\gamma(^{115}\text{Rh})$ (continued)

‡ Weak γ , seen in coin with 213.2 γ .

From $\beta\gamma$ coin spectra.

@ Values are from BrIcc code available.

& For absolute intensity per 100 decays, multiply by 0.83 5.

^a Placement of transition in the level scheme is uncertain.

¹¹⁵Ru β⁻ decay 2011Ri07,2010Ku01,2007Ku06

Decay Scheme

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)

