

$^{100}\text{Ru}(\text{p},\text{n}\gamma)$ 1983Bi04,1984BiZU

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

1983Bi04 (also 1984Bi07,1984BiZU): E=4.4 MeV to 6.0 MeV proton beams were produced from the 7.5-MV Van de Graaff accelerator of the Laboratori Nazionali di Legnaro. Target was $60 \mu\text{g}/\text{cm}^2$ 92.9% enriched ^{100}Ru on a $20 \mu\text{g}/\text{cm}^2$ carbon foil. γ rays were detected by HPGe planar detectors. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin, $\gamma(t)$, excitation functions. The ce data are reported in 1984BiZU. Deduced levels, J, π , $T_{1/2}$, γ -ray multipolarities.

			<u>^{100}Rh Levels</u>		
<u>E(level)[†]</u>	<u>Jπ[#]</u>	<u>T_{1/2}[‡]</u>	<u>E(level)[†]</u>	<u>Jπ[#]</u>	<u>T_{1/2}[‡]</u>
0.0	1 ⁻		255.77 11		<0.35 ns
32.693 13	(2) ⁻	25.3 ns 31	281.97 3	(1,2,3) ⁺	<0.35 ns
74.777 14	(2) ⁺	217 ns 5	325.17 13		<0.35 ns
86.33 2	(1,2)	<0.35 ns	329.4 5		0.76 ns 28
136.32 3	(1)	<0.35 ns	376.7 4		<0.35 ns
139.84? 2	(0,1)	<0.35 ns	389.7 4		0.62 ns 28
151.80 2	(1) ⁺	0.97 ns 14	445.49 4		<0.35 ns
158.78 2	1 ⁺	<0.35 ns	473.2 5		
160.69 2		3.95 ns 21	517.71 5		<0.35 ns
171.10 2		<0.35 ns	531.9 5		
221.79? 6			561.0 5		
248.04 3	(1,2) ⁺	<0.35 ns			

[†] From least-squares fit to $E\gamma$ data.

[‡] From $\gamma(t)$ using pulsed-beam method in 1983Bi04, with statistical uncertainty only.

[#] From the Adopted Levels.

¹⁰⁰Ru(p,n γ) **1983Bi04,1984BiZU** (continued)

										$\gamma(^{100}\text{Rh})$	
E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\@$	$I_{(\gamma+ce)}$	Comments	
(15.5)		151.80	(1) ⁺	136.32	(1)				16.0 5	E_γ : from requirement of consistency of $\gamma\gamma$ data. $I_{(\gamma+ce)}$: estimated by the authors of 1983Bi04 from $\gamma\gamma$ -coin.	
26.2&	<1.0	281.97	(1,2,3) ⁺	255.77							
32.70 2	12.2 7	32.693	(2) ⁻	0.0	1 ⁻						
42.10 2	13.0 8	74.777	(2) ⁺	32.693	(2) ⁻						
43.19 12	0.38 16	325.17		281.97	(1,2,3) ⁺						
^x 44.4‡											
53.66 2	8.3 2	86.33	(1,2)	32.693	(2) ⁻						
61.54 2	31.4 8	136.32	(1)	74.777	(2) ⁺						
65.5	<1.2	151.80	(1) ⁺	86.33	(1,2)						
74.40 10	\approx 4	160.69		86.33	(1,2)						
74.78 2	100 2	74.777	(2) ⁺	0.0	1 ⁻						
^x 78.4‡											
84.02 2	27.3 7	158.78	1 ⁺	74.777	(2) ⁺						
84.79 2	6.6 2	171.10		86.33	(1,2)						
85.46& 5	1.2 2	221.79?		136.32	(1)						
86.33 2	12.6 4	86.33	(1,2)	0.0	1 ⁻						
96.24 3	3.0 2	248.04	(1,2) ⁺	151.80	(1) ⁺						
111.9&	<0.6	248.04	(1,2) ⁺	136.32	(1)						
^x 117.65‡ 2	7.4 3										
119.2 1	<8.6	151.80	(1) ⁺	32.693	(2) ⁻					I_γ : total I_γ for 119.2 γ +119.4 γ =8.6 3.	
119.4 1	<8.6	255.77		136.32	(1)						
126.05 3	4.3 2	158.78	1 ⁺	32.693	(2) ⁻						
128.00 3	2.8 2	160.69		32.693	(2) ⁻						
138.36 3	3.1 2	171.10		32.693	(2) ⁻						
139.84 2	7.7 2	139.84?	(0,1)	0.0	1 ⁻						
151.79 2	20.0 5	151.80	(1) ⁺	0.0	1 ⁻	E1		0.0440		$\alpha(\text{K})_{\text{exp}}=0.040$ 8 (1984BiZU) $\alpha(\text{K})=0.0385$ 6; $\alpha(\text{L})=0.00452$ 7; $\alpha(\text{M})=0.000835$ 12 $\alpha(\text{N})=0.0001367$ 20; $\alpha(\text{O})=6.33\times 10^{-6}$ 9	
158.3 5		329.4		171.10							
158.8	<1.0	158.78	1 ⁺	0.0	1 ⁻						
160.68 3	3.0 2	160.69		0.0	1 ⁻						
163.55 5	1.1 2	445.49		281.97	(1,2,3) ⁺						
173.27 3	8.4 3	248.04	(1,2) ⁺	74.777	(2) ⁺	M1(+E2)	<0.6	0.091 15		$\alpha(\text{K})_{\text{exp}}=0.077$ 15 (1984BiZU) $\alpha(\text{K})=0.078$ 13; $\alpha(\text{L})=0.0103$ 24; $\alpha(\text{M})=0.0019$ 5 $\alpha(\text{N})=0.00031$ 7; $\alpha(\text{O})=1.40\times 10^{-5}$ 17	
188.9	\approx 0.9	325.17		136.32	(1)						
192.2& 5		517.71		325.17						I_γ : from authors' spectrum, $I_\gamma(192\gamma)/I_\gamma(366\gamma)<0.06$.	
207.20 3	8.8 6	281.97	(1,2,3) ⁺	74.777	(2) ⁺	M1(+E2)	<0.4	0.051 4		$\alpha(\text{K})_{\text{exp}}=0.039$ 8 (1984BiZU)	

¹⁰⁰Ru(p,n) γ [1983Bi04](#), [1984BiZU](#) (continued)

$\gamma(^{100}\text{Rh})$ (continued)

E_γ †	I_γ †	E_i (level)	E_f	J_f^π	Comments
					$\alpha(\text{K})=0.044$ 3; $\alpha(\text{L})=0.0055$ 6; $\alpha(\text{M})=0.00102$ 11 $\alpha(\text{N})=0.000168$ 17; $\alpha(\text{O})=8.1 \times 10^{-6}$ 5
218.5 5		389.7	171.10		
^x 253.4 ‡					
286.70 3	12.0 8	445.49	158.78	1 ⁺	
290.5 5		376.7	86.33	(1,2)	
303.4 5		389.7	86.33	(1,2)	
309.2	≈ 2.3	445.49	136.32	(1)	
312.5 5		473.2	160.69		
343.9 5		376.7	32.693	(2) ⁻	
360.8 5		531.9	171.10		
365.91 4	21.4 14	517.71	151.80	(1) ⁺	
389.9 5		561.0	171.10		

† From [1983Bi04](#), unless otherwise noted.

‡ 44.4 γ , 78.4 γ , 117.65 γ and 253.4 γ reported in mutual coin but not with any other transition assigned in the level scheme. The authors propose an isomer at ≈ 300 keV.

From ce data of $\alpha(\text{K})_{\text{exp}}$ in [1984BiZU](#).

@ 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.

^x γ ray not placed in level scheme.

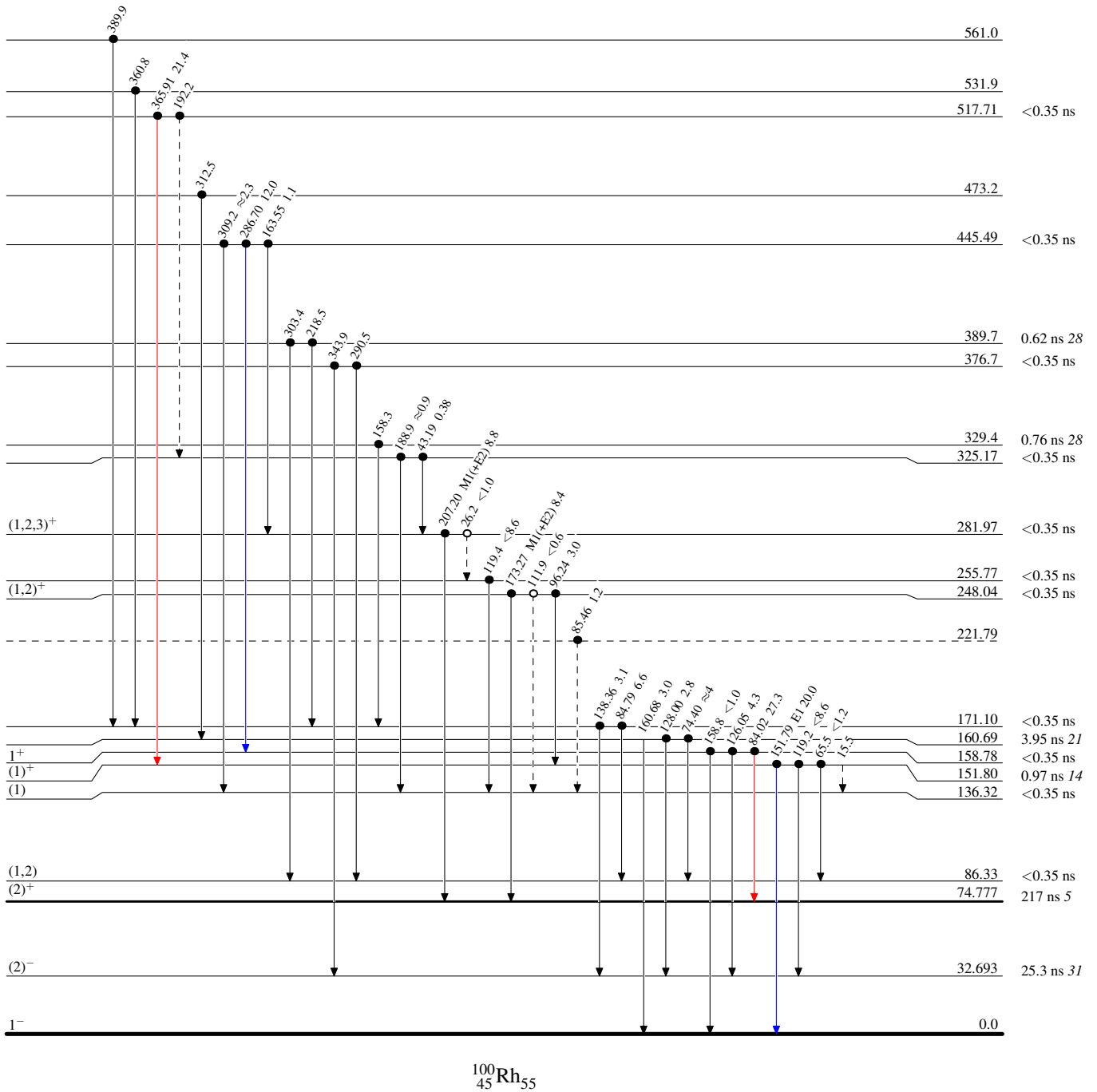
$^{100}\text{Ru}(p,n)$ 1983Bi04,1984BiZU

Level Scheme

Intensities: Relative I_γ

Legend

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







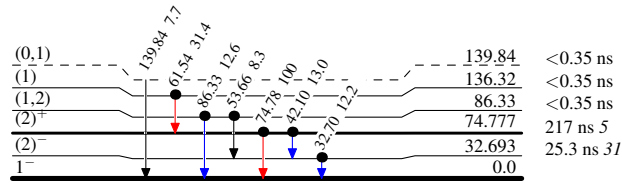
$^{100}\text{Ru}(p,n\gamma)$ 1983Bi04,1984BiZU

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



$^{100}_{45}\text{Rh}_{55}$