^{102}Ru(p,nγ) 1984Bi04,1984BiZU

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

1984Bi04,1984BiZU: E(p)=3.1-6 MeV. Measured: γ excit, $\gamma\gamma$, $\gamma\gamma$(t), Branching, x-rays. Deduced: ^{102}Rh levels, $T_{1/2}$, α.
Others: 1982Bi12, 1983Do11.

^{102}Rh Levels

E(level)†	Jπ‡	$T_{1/2}$#	Comments
0.0	(1$^-$,2$^-$)		
41.942 *15*	2$^{(-)}$	18.9 ns *4*	$T_{1/2}$: from 1982Bi12.
105.216 *16*	(1$^+$,2$^+$,3$^+$)	1.0 ns *3*	$T_{1/2}$: weighted average of 0.90 ns *7* and 1.04 ns *21*, given as extreme values by 1984Bi04.
123.752 *18*	(1$^-$,2$^-$,3$^-$)	0.4 ns *2*	
156.492 *24*		<0.3 ns	
178.68 *4*	(3)$^+$	1.04 ns *21*	
206.88 *3*		<0.3 ns	
208.74 *4*		0.34 ns *21*	
259.57 *4*		<0.3 ns	
263.84 *4*	(5$^+$)	<0.4 ns	
291.54 *4*		<0.3 ns	
302.22 *3*		<0.3 ns	
305.89 *4*		<0.3 ns	
345.77 *9*		<0.7 ns	
359.61 *6*		0.6 ns *3*	
364.80 *5*		<0.3 ns	
399.39 *12*	(5,6,7)	<0.7 ns	
409.91 *5*		<0.3 ns	
427.52 *6*		<0.3 ns	
431.48 *6*		<0.3 ns	
449.36 *5*		<0.4 ns	
450.6 *15*			
474.34 *7*			
525.1 *3*			
542.14 *11*		<0.3 ns	
543.55 *20*		<0.7 ns	
545.89 *8*		<0.3 ns	
546.7 *10*			
575.93 *8*		<0.3 ns	
579.1?			
598.95 *11*		<0.3 ns	
601.38 *21*			
632.5 *10*			
645.82 *21*		<0.4 ns	

† Calculated by the evaluator using a least-squares procedure from Eγ of 1984Bi04.
‡ From Adopted Levels.
\# Obtained with centroid-shift (1984Bi04).

^{102}Ru(p,nγ) 1984Bi04,1984BiZU (continued)

γ(^{102}Rh)

α(K)exp from 1984BiZU obtained from fluorescence x-rays method.
ΔIγ: only statistical uncertainty given.

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[@]	Comments
22[a]		178.68	$(3)^+$	156.492				
28.17 *4*	2.2 *1*	206.88		178.68	$(3)^+$			
39.9		345.77		305.89				
41.94 *2*	27.6 *2*	41.942	$2^{(-)}$	0.0	$(1^-,2^-)$	M1	4.19	α(K)=3.64 α(K)exp=4.4 *5*
50.4[a]		206.88		156.492				
51.27 *2*	29.4 *2*	156.492		105.216	$(1^+,2^+,3^+)$			
54.9	0.003	178.68	$(3)^+$	123.752	$(1^-,2^-,3^-)$			
63.27 *2*	32.0 *2*	105.216	$(1^+,2^+,3^+)$	41.942	$2^{(-)}$			
[x]81.31 *10*	0.6 *1*							
81.82 *4*	3.9 *1*	123.752	$(1^-,2^-,3^-)$	41.942	$2^{(-)}$			
82.9	<0.16	291.54		208.74				
85.16 *5*	10.2 *3*	263.84	(5^+)	178.68	$(3)^+$			
95.34 *2*	13.7 *1*	302.22		206.88				
100.04 *4*	1.2 *2*	359.61		259.57				
101.66 *3*	16.9 *3*	206.88		105.216	$(1^+,2^+,3^+)$			α(K)exp=0.16 *3* α(K)exp: Value is sum for 101.66γ, 103.08γ and 105.22γ.
103.08 *3*	12.1 *3*	259.57		156.492				α(K)exp=0.16 *3* α(K)exp: Value is sum for 101.66γ, 103.08γ and 105.22γ.
105.22 *2*	100.0 *6*	105.216	$(1^+,2^+,3^+)$	0.0	$(1^-,2^-)$	E1	0.1261	α(K)= 0.1103 α(K)exp=0.16 *3* α(K)exp: Value is sum for 101.66γ, 103.08γ and 105.22γ.
107.72 *5*	1.30 *5*	409.91		302.22				
109.54 *5*	3.7 *2*	474.34		364.80				
119.25[a]		546.7		427.52				E_γ: only given in level scheme not in table with gammas.
123.75 *2*	30.3 *3*	123.752	$(1^-,2^-,3^-)$	0.0	$(1^-,2^-)$	M1	0.189	α(K)= 0.1662 α(K)exp=0.14 *3*
135.55 *10*	32.9 *3*	399.39	(5,6,7)	263.84	(5^+)	(E1)	0.0608	α(K)= 0.0533 α(K)exp=0.047 *7* E_γ: member of unresolved multiplet at 137 keV. α(K)exp: Sum for 135.55γ and 136.71γ. I_γ: including contribution from 136.11γ due to tantalum.
136.20[&] *15*	32.9[&] *3*	545.89		409.91				I_γ: including contribution from 136.11γ due to tantalum.
136.71 *6*	32.9 *3*	178.68	$(3)^+$	41.942	$2^{(-)}$	(E1)	0.0594	α(K)= 0.0520 α(K)exp=0.047 *7* E_γ,I_γ: member of unresolved multiplet at 136 keV. α(K)exp: Sum for 135.55γ and 136.71γ. I_γ: including contribution from 136.11γ due to tantalum.
137.00 *10*	32.9 *3*	345.77		208.74				I_γ: including contribution from 136.11γ due to tantalum.

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^{102}Ru(p,nγ) 1984Bi04,1984BiZU (continued)

γ(^{102}Rh) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	E_f	J^π_f	Mult.[#]	α[@]	Comments
							E_γ: member of unresolved multiplet at 137 keV.
145.70 *6*	1.27 *6*	302.22	156.492				
147.11 *5*	1.6 *1*	449.36	302.22				
148.41 *5*	2.2 *1*	575.93	427.52				
[x]149.50 *10*	0.8 *1*						
156.50[&] *10*	9.2[&] *1*	156.492	0.0	(1^-,2^-)			
[x]156.60[&] *10*	9.2[&] *1*						
164.90 *10*	2.70 *7*	206.88	41.942	$2^{(-)}$			
166.80 *3*	23.5 *2*	208.74	41.942	$2^{(-)}$			
167.7[a]		431.48	263.84	(5^+)			
167.80 *7*	4.1 *1*	291.54	123.752	(1^-,2^-,3^-)			E_γ: possible doublet.
182.14 *3*	10.8 *2*	305.89	123.752	(1^-,2^-,3^-)	M1	0.0662	α(K)= 0.0581 α(K)exp=0.054 *9*
186.1 *1*	1.6 *3*	364.80	178.68	$(3)^+$			
191.0 *15*	1.8 *3*	450.6	259.57				E_γ: possible doublet.
197.0[a]		302.22	105.216	(1^+,2^+,3^+)			
[x]205.15 *5*	10.8 *2*						
206.93 *7*	1.6 *2*	206.88	0.0	(1^-,2^-)			
208.25 *10*	4.7 *7*	364.80	156.492				
208.65 *10*	6.4 *7*	208.74	0.0	(1^-,2^-)			
210.3[a]		474.34	263.84	(5^+)			
214.65	≈0.06	474.34	259.57				
218.78 *5*	7.5 *2*	427.52	208.74				
224.60 *5*	5.1 *2*	431.48	206.88				
234.15 *10*	1.6 *3*	598.95	364.80				
236.25 *10*	1.8 *3*	542.14	305.89				
239.33 *10*	1.6 *2*	598.95	359.61				
243.61 *8*	3.5 *2*	545.89	302.22				
249.61 *5*	4.0 *2*	291.54	41.942	$2^{(-)}$			
255.4[a]		546.7	291.54				E_γ: only given in level scheme not in table with gammas.
259.60 *5*	10.4 *11*	364.80	105.216	(1^+,2^+,3^+)			
260.28 *10*	4.1 *6*	302.22	41.942	$2^{(-)}$			
270.80 *10*	4.1 *3*	449.36	178.68	$(3)^+$			E_γ: possible doublet.
275.1	≈0.08	431.48	156.492				
291.53 *5*	8.8 *4*	291.54	0.0	(1^-,2^-)			
292.88 *10*	2.9 *3*	449.36	156.492				
[x]296.08 *10*	3.9 *10*						
302.25 *15*	2.9 *7*	302.22	0.0	(1^-,2^-)			
303.90 *15*	3.2 *6*	345.77	41.942	$2^{(-)}$			
304.70 *10*	3.2 *6*	409.91	105.216	(1^+,2^+,3^+)			
318.2 *3*	1.9 *3*	525.1	206.88				
335.2		598.95	263.84	(5^+)			
339.1		598.95	259.57				
343.6 *2*	3.3 *4*	645.82	302.22				
344.2 *2*	4.6 *9*	449.36	105.216	(1^+,2^+,3^+)			
368.7		632.5	263.84	(5^+)			
370.6[a]		579.1?	208.74				
394.5 *2*	4.0 *4*	601.38	206.88				
419.8 *2*	3.6 *4*	543.55	123.752	(1^-,2^-,3^-)			
440.3[a]		545.89	105.216	(1^+,2^+,3^+)			
454.9[a]		579.1?	123.752	(1^-,2^-,3^-)			

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^{102}Ru(p,nγ) 1984Bi04,1984BiZU (continued)

γ(^{102}Rh) (continued)

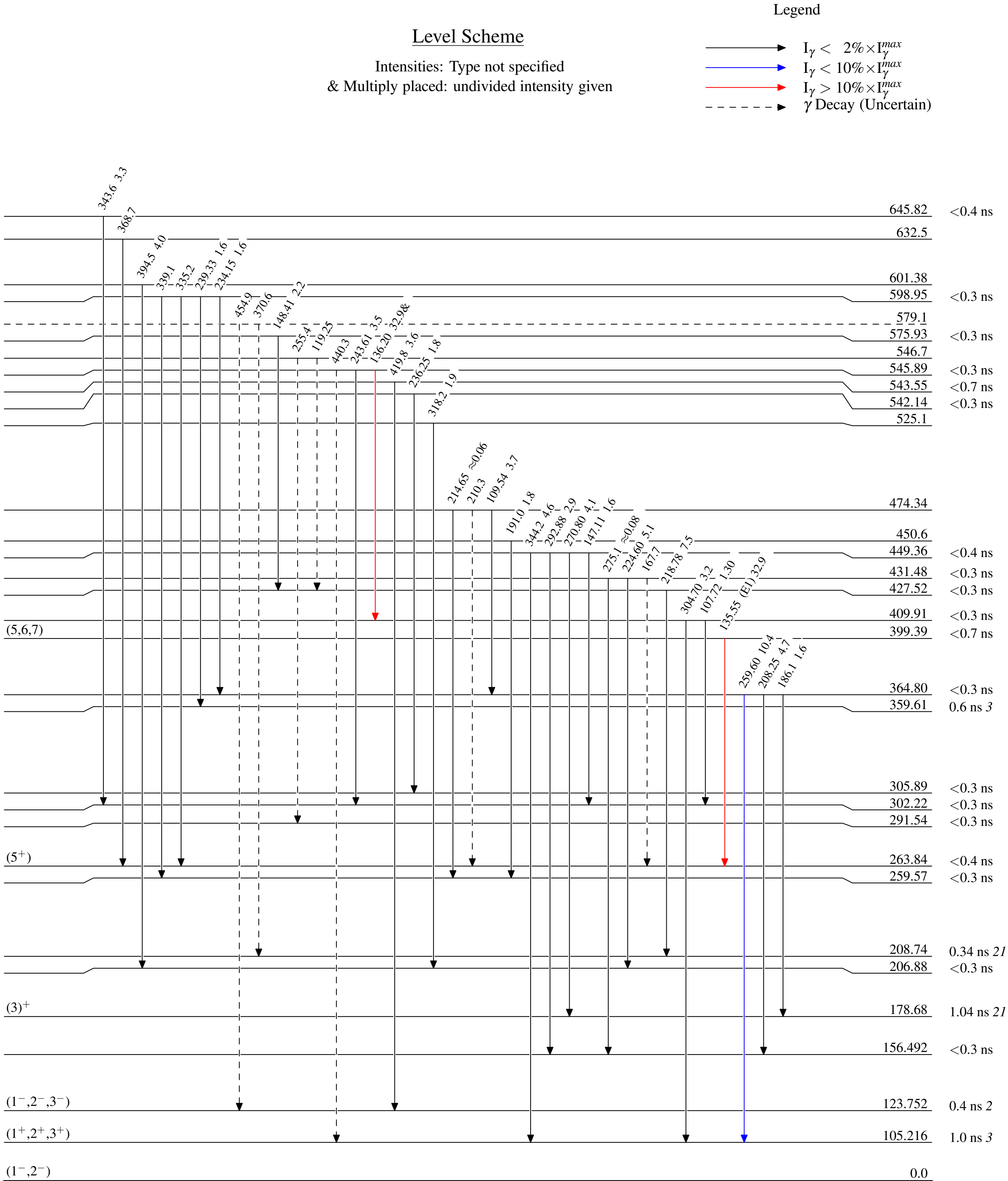
† Given for E(p)=5.5 MeV and at θ=90° (1984Bi04).
‡ Given for E(p)=5.5 MeV and at θ=55° (1984Bi04).
# Based on α(K)exp (1984BiZU).
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
& Multiply placed with undivided intensity.
[a] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{102}Ru(p,nγ) 1984Bi04,1984BiZU

Level Scheme

Intensities: Type not specified

& Multiply placed: undivided intensity given



$^{102}_{45}Rh_{57}$

^{102}Ru(p,nγ) 1984Bi04,1984BiZU

Level Scheme (continued)

Intensities: Type not specified

& Multiply placed: undivided intensity given

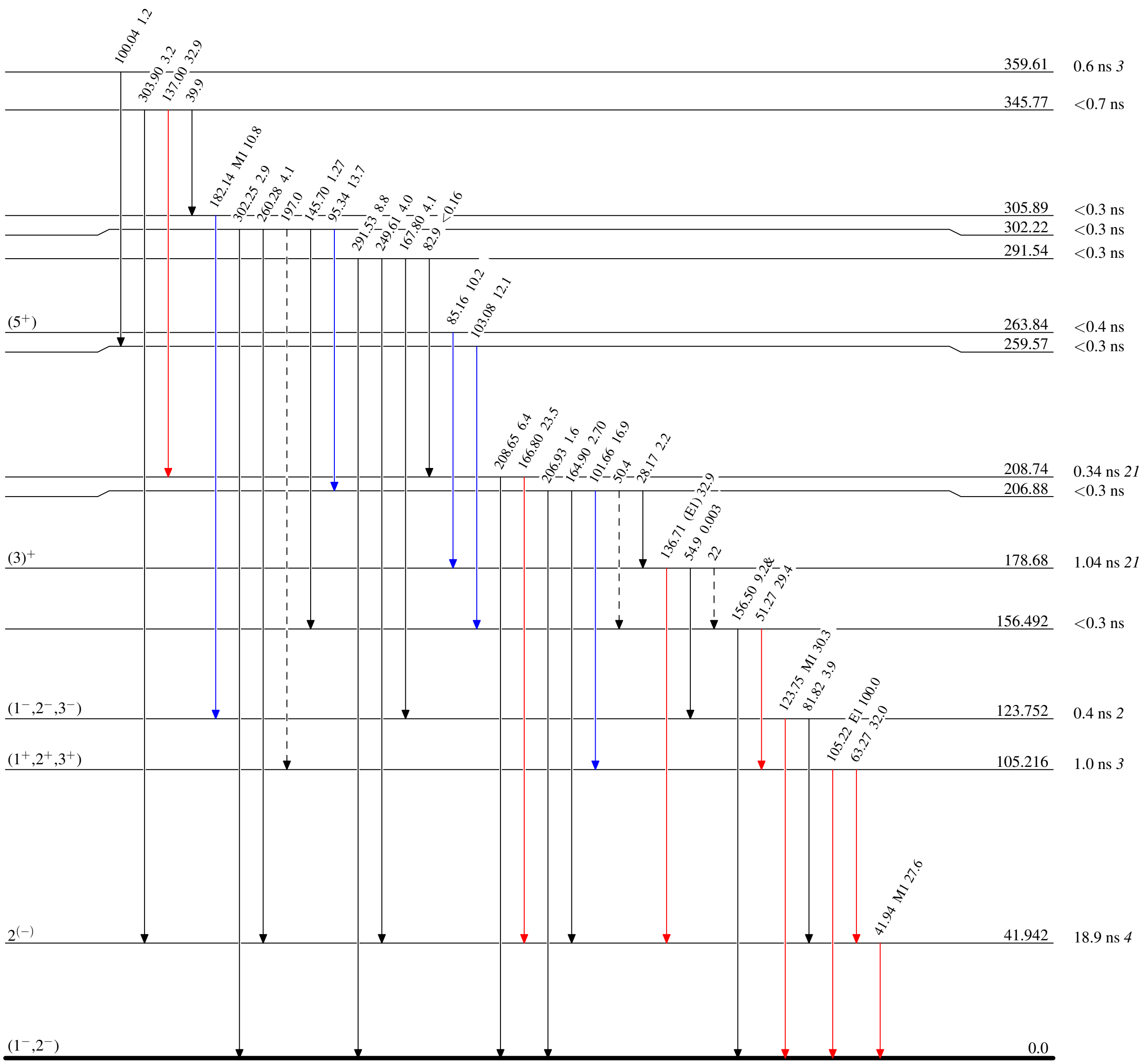
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{102}_{45}Rh_{57}$