Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112,1163 (2011)	15-Dec-2010

Q(β^-)=−9.9×10^3 *syst*; S(n)=14084 *6*; S(p)=2000 *4*; Q(α)=−4042 *5* 2012Wa38
Note: Current evaluation has used the following Q record −9570 syst 14084 6 *2001* 5 −4041 5 2003Au03,2009AuZZ.
Q(β^-), S(n), S(p), Q(α): from 2009AuZZ (cf. −9470 *570* (syst.), 13880 *570* (syst.), 2007 *9*, −3750 *450* (syst.), respectively, from 2003Au03).
ΔQ-=400 (2009AuZZ).
Q(ε-p)=2624 *5* (2009AuZZ) (cf. 2470 syst (2003Au03)).
For shell-model calculations see, e.g., 1997He24 and 2000Sc31.

^{93}Rh Levels

Cross Reference (XREF) Flags

- A ^{58}Ni(^{40}Ca,3p2nγ)
- B ^{93}Pd ε decay
- C ^{94}Ag εp decay

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0[a]	(9/2$^+$)	12.2 s *7*	ABC	%ε+%β^+=100 $T_{1/2}$: weighted average of 11.9 s *7* (2004De40; from fit to growth and decay time behavior of the 7 lines attributed to ^{93}Rh decay) and 13.9 s *16* (2001Ki13). Other datum: 5.7 s *+13−9* (preliminary result from 2000WeZZ; probably superseded by 2001Ki13).
240.10 *10*	(7/2$^+$)@		BC	
621.9 *7*	(5/2$^+$)@		BC	
852.90[a] *10*	(13/2$^+$)		A C	
864.1 *10*	@		B	
894.20 *10*	(11/2$^+$)		C	
1451.1 *6*	(7/2$^+$)		C	
1463.9 *7*	(13/2$^+$)		C	
1630.1 *10*	(9/2$^+$)		C	
1718.4 *5*	(11/2$^+$)		C	
1718.91[a] *15*	(17/2$^+$)		A C	
2052.31[a] *18*	(21/2$^+$)		A C	
2197.8? *5*	(5/2$^+$)		C	
2595.1[a] *11*	(23/2$^+$)		A C	
2890.5[a] *11*	(25/2$^+$)		A C	
3543.0[b] *11*	(25/2$^+$)		A C	
4089.0[b] *11*	(27/2$^+$)		A C	
4252.1[b] *11*	(29/2$^+$)		A C	
4549.1[b] *13*	(31/2$^+$)		A C	
4611.4[c] *11*	(27/2$^-$,29/2$^-$)		A C	
4708.1[b] *16*	(33/2$^+$)		A C	
4749.0[c] *11*	(29/2$^-$,31/2$^-$)		A C	
5159.2[b] *19*	(35/2$^+$)		A	E(level): an alternative value of 5171.6 is possible because the order of the 451γ-463γ cascade could not Be established in (^{40}Ca,3p2nγ).
5447.0[c] *11*	(29/2 to 35/2)$^{(-)}$&		A C	
5622.8[b] *22*	(37/2$^+$)		A	
5693.9[c] *11*	(31/2 to 39/2)$^{(-)}$&		A C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{93}Rh Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF
5827.6[#d] *24*		A
6388.6[c] *15*	(35/2 to 41/2)$^{(-)}$&	A C
6579.7[c] *15*	(35/2 to 47/2)$^{(-)}$&	C
6709.9?[c] *15*	(37/2 to 47/2)$^{(-)}$&	C
6857.9?[c] *18*	(39/2 to 47/2)$^{(-)}$&	C
6924.5[#d] *24*	(41/2^{+})	A

[†] From least-squares fit to Eγ, allowing 1 keV uncertainty in Eγ data for which the authors did not state the uncertainty.
[‡] Tentative values from (^{40}Ca,3p2nγ), based on level systematics in neighboring N=48 odd-A nuclei (1995Ro06), except as noted. Supported by shell-model calculations in ($p_{1/2}$, $g_{9/2}$) configuration space for both protons and neutrons; the calculations describe the π=+ yrast states well.
[#] Possible π=+, seniority=7 yrast state, by analogy with shell−model calculations for ^{91}Tc.
[@] Shell-model calculations by 2000Sc31 predict 7/2^{+}, 5/2^{+} and 13/2^{+} levels at E=263, 601 and 877, respectively. However, the evaluator presumes that the predicted 13/2^{+} state is the 853 level, not the 864 level (suggested by 2000Sc31).
[&] Proposed by 2004Mu30 in ^{94}Ag εp decay.
[a] Band(A): Possible π=+, seniority=3 states (1995Ro06). By analogy with shell−model calculations for ^{91}Tc.
[b] Band(B): Possible π=+, seniority=5 states. By analogy with shell−model calculations for ^{91}Tc (1995Ro06).
[c] Band(C): π=(−) sequence (2004Mu30). π based on absence of transitions from higher members to π=(+) sequence of levels. Built on (27/2^{-},29/2^{-}) 4611 level.
[d] Band(D): Possible π=+, seniority=7 states. By analogy with shell−model calculations for ^{91}Tc (1995Ro06).

Adopted Levels, Gammas (continued)

γ(^{93}Rh)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[@]	Comments
240.10	(7/2$^+$)	240.1[‡] *1*	100[‡]	0.0	(9/2$^+$)	[M1]	0.0319	E_γ: from ε decay.
621.9	(5/2$^+$)	381.7[#]	100[#] *12*	240.10	(7/2$^+$)			
		622[#] *1*	38[#] *8*	0.0	(9/2$^+$)			Other Eγ: 621.7 in (^{40}Ca,3p2nγ).
852.90	(13/2$^+$)	852.9[‡] *1*	100[‡]	0.0	(9/2$^+$)			
864.1		864.1[#]	100[#]	0.0	(9/2$^+$)			
894.20	(11/2$^+$)	654[‡] *1*		240.10	(7/2$^+$)			
		894.2[‡] *1*	100[‡] *5*	0.0	(9/2$^+$)			
1451.1	(7/2$^+$)	557[‡] *1*		894.20	(11/2$^+$)			
		1451.0[‡] *7*	100[‡] *32*	0.0	(9/2$^+$)			
1463.9	(13/2$^+$)	570[‡] *1*		894.20	(11/2$^+$)			
		1463.7[‡] *8*	100[‡] *40*	0.0	(9/2$^+$)			
1630.1	(9/2$^+$)	1390[‡] *1*	100	240.10	(7/2$^+$)			
1718.4	(11/2$^+$)	1718.4[‡] *5*	100	0.0	(9/2$^+$)			
1718.91	(17/2$^+$)	866.0[‡] *1*	100	852.90	(13/2$^+$)			
2052.31	(21/2$^+$)	333.4[‡] *1*	100	1718.91	(17/2$^+$)	[E2]		
2197.8?	(5/2$^+$)	2197.8[‡] *5*	100	0.0	(9/2$^+$)			
2595.1	(23/2$^+$)	542.8[‡]	100	2052.31	(21/2$^+$)			
2890.5	(25/2$^+$)	295.4[‡] *2*	100	2595.1	(23/2$^+$)			
3543.0	(25/2$^+$)	652.5[‡] *2*	53 *27*	2890.5	(25/2$^+$)			
		948[‡] *1*	100 *27*	2595.1	(23/2$^+$)			Other Eγ: 947.4 in (^{40}Ca,3p2nγ).
4089.0	(27/2$^+$)	545.5	100 *26*	3543.0	(25/2$^+$)			
		1493.8[‡] *3*	65 *17*	2595.1	(23/2$^+$)			Other Iγ: 27 *12* from εp decay.
4252.1	(29/2$^+$)	1361.7[‡] *3*	100[‡]	2890.5	(25/2$^+$)			Other Eγ: 1360.4 in (^{40}Ca,3p2nγ).
4549.1	(31/2$^+$)	297.2	100 *27*	4252.1	(29/2$^+$)			
		460.0	80 *20*	4089.0	(27/2$^+$)			
4611.4	(27/2$^-$,29/2$^-$)	522.4[‡] *1*	100	4089.0	(27/2$^+$)			
4708.1	(33/2$^+$)	159[‡] *1*	100	4549.1	(31/2$^+$)			Other Eγ: 158.5 in (^{40}Ca,3p2nγ).
4749.0	(29/2$^-$,31/2$^-$)	137.6[‡] *1*	100 *15*	4611.4	(27/2$^-$,29/2$^-$)			I_γ: weighted average of 100 *24* from (^{40}Ca,3p2nγ) and 100 *20* from εp decay.
		496.9[‡] *3*	34 *8*	4252.1	(29/2$^+$)			I_γ: weighted average of 29 *12* from (^{40}Ca,3p2nγ) and 37 *10* from εp decay.
5159.2	(35/2$^+$)	451.1	100	4708.1	(33/2$^+$)			
5447.0	(29/2 to 35/2)$^{(-)}$	698.0[‡] *1*	100	4749.0	(29/2$^-$,31/2$^-$)			
5622.8	(37/2$^+$)	463.5	100	5159.2	(35/2$^+$)			

From ENSDF

$^{93}_{45}Rh_{48}$-3

Adopted Levels, Gammas (continued)

γ(^{93}Rh) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
5693.9	(31/2 to 39/2)$^{(-)}$	246.9‡ *1*	100	5447.0	(29/2 to 35/2)$^{(-)}$
5827.6		204.8	100	5622.8	(37/2$^+$)
6388.6	(35/2 to 41/2)$^{(-)}$	694.7	100	5693.9	(31/2 to 39/2)$^{(-)}$
6579.7	(35/2 to 47/2)$^{(-)}$	191.1‡ *1*	100	6388.6	(35/2 to 41/2)$^{(-)}$
6709.9?	(37/2 to 47/2)$^{(-)}$	130.2‡ *3*	100	6579.7	(35/2 to 47/2)$^{(-)}$
6857.9?	(39/2 to 47/2)$^{(-)}$	148‡ *1*	100	6709.9?	(37/2 to 47/2)$^{(-)}$
6924.5	(41/2$^+$)	1301.7	100	5622.8	(37/2$^+$)

† From (^{40}Ca,3p2nγ), except as noted. Uncertainty in Eγ unstated by authors.
‡ From ^{94}Ag εp decay.
# From ^{93}Pd ε decay. Uncertainty in Eγ unstated by authors.
@ 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.

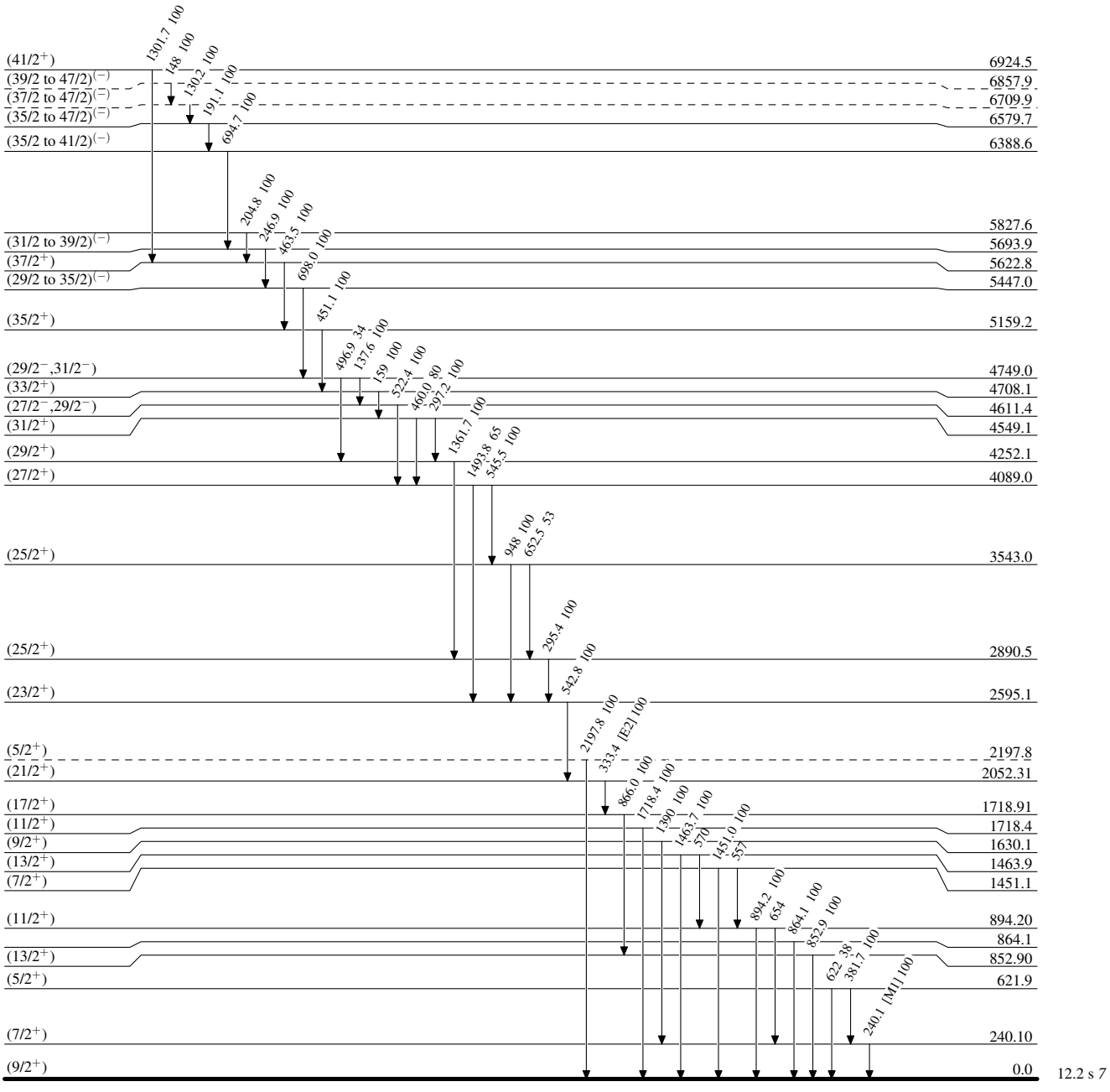
From ENSDF

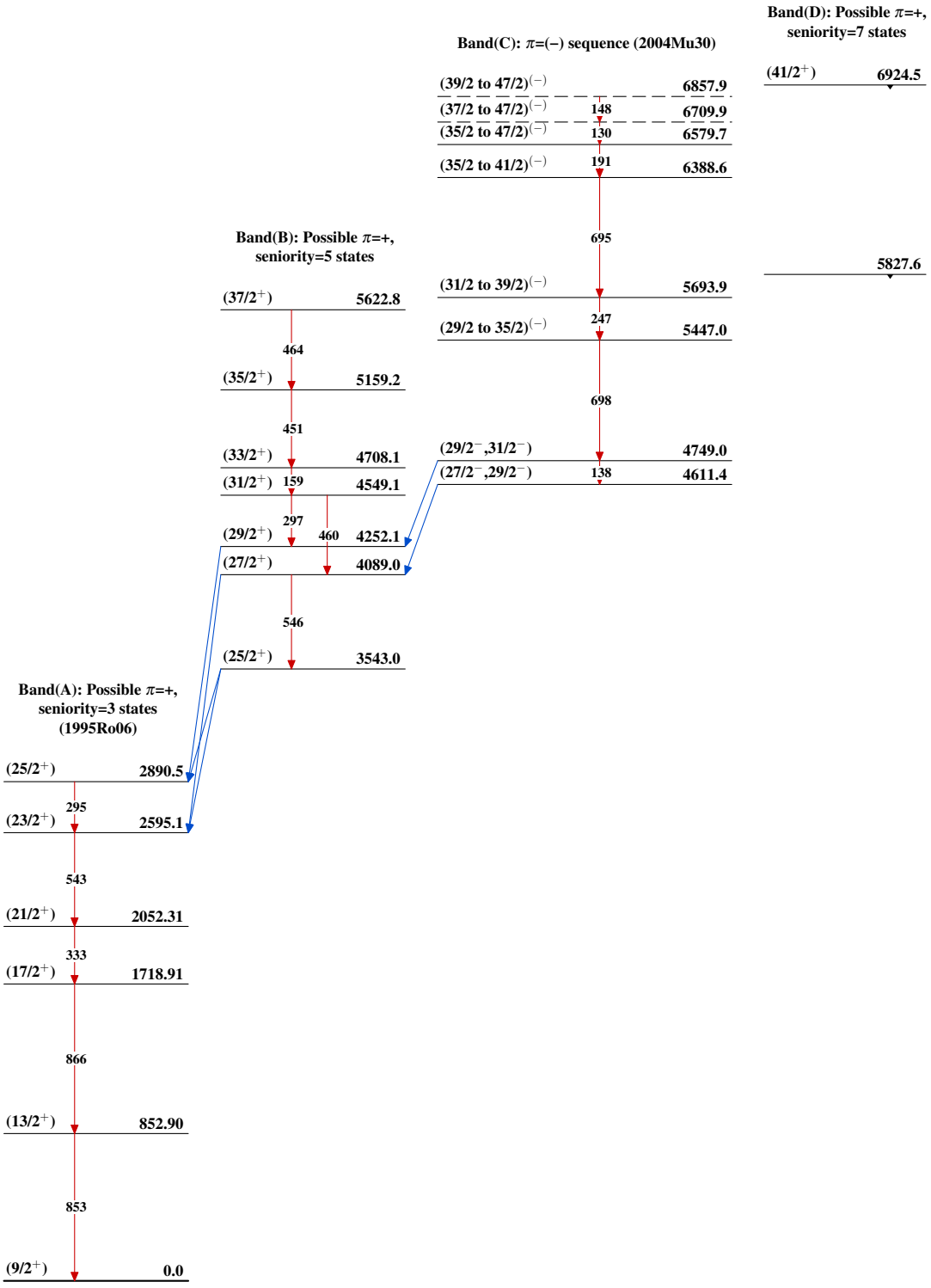
$^{93}_{45}Rh_{48}$-4

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{93}_{45}Rh_{48}$

Adopted Levels, Gammas