

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, F. G. Kondev		NDS 124, 157 (2015)	1-Aug-2014

Q(β⁻)=6.59×10³ 4; S(n)=5.50×10³ 4; S(p)=1.024×10⁴ 5; Q(α)=-6.24×10³ 4 [2012Wa38](#)

¹¹²Rh Levels

Cross Reference (XREF) Flags

- A ¹¹²Ru β⁻ decay
- B ²⁵²Cf SF decay
- C ²⁰⁸Pb(¹⁸O,Fγ)

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0.0	(1 ⁺)	3.6 s 3	A	%β ⁻ =100 J ^π : Direct β ⁻ decay feeding to the 0 ⁺ and 2 ⁺ states in ¹¹² Pd; systematics of known J ^π and configurations in neighbouring nuclei. T _{1/2} : weighted average of 3.5 s 4 (1999Lh01) and 3.8 s 6 (1988Ay02); Others: 2.1 s 3 (1991Jo11), 1.2 s 6 (1987GiZW), 0.8 s 1 (1976MaYL), 5.17 s 7 (1969WiZX), <1.5 s (1978Fr16), 0.7 s 3 (1985Bu05). configuration: π7/2 ⁺ [413]⊗ν5/2 ⁺ [413] and prolate deformation from systematics of known orbitals in neighbouring nuclei (π7/2 ⁺ [413] in even-Z ¹¹¹ Ru and ¹¹³ Pd nuclei and ν5/2 ⁺ [413] in even-N ¹⁰⁷⁻¹¹¹ Rh nuclei); the assignment is supported by the Gallagher-Moszkowski rule.
82.27 17	(1 ⁺ ,2 ⁺)		A	J ^π : 82.3γ M1+E2 to (1 ⁺).
327.03 17	(1 ⁺)		A	J ^π : 327.0γ M1+E2 to (1 ⁺), 244.8γ M1(+E2) to (1 ⁺ ,2 ⁺); possible direct feeding in ¹¹² Ru (J ^π =0 ⁺) β ⁻ decay.
542.0 5	(1,2)		A	J ^π : 459.5γ to (1,2) ⁺ .
670.2 5	(1)		A	J ^π : 128.0γ to (1,2), 588.1γ to (1,2) ⁺ ; possible direct feeding in ¹¹² Ru (J ^π =0 ⁺) β ⁻ decay.
0.0+y	(6 ⁺)	6.76 s 12	BC	%β ⁻ =100 Additional information 1. J ^π : direct β ⁻ feeding to 5 ⁺ and 6 ⁺ states in ¹¹² Pd; systematics of known J ^π and configurations in neighbouring nuclei. T _{1/2} : weighted average of 6.73 s 15 (1999Lh01) and 6.8 s 2 (1988Ay02). configuration: π7/2 ⁺ [413]⊗ν5/2 ⁺ [413] and prolate deformation from systematics of known orbitals in neighbouring nuclei (π7/2 ⁺ [413] in even-Z ¹¹¹ Ru and ¹¹³ Pd nuclei and ν5/2 ⁺ [413] in even-N ¹⁰⁷⁻¹¹¹ Rh nuclei); the assignment is supported by the Gallagher-Moszkowski rule.
60.58+y [‡] 10	(7 ⁻)		BC	J ^π : 60.58γ (E1) to (6 ⁺).
219.86+y [#] 13	(8 ⁻)		BC	J ^π : 159.16γ (M1+E2) to (7 ⁻); band member.
402.89+y [‡] 13	(9 ⁻)		BC	J ^π : 183.03γ (M1+E2) to (8 ⁻), 342.42γ to (7 ⁻); band member.
557.7+y [@] 3	(9 ⁻)		B	J ^π : 337.9γ to (8 ⁻), 497.2γ to (7 ⁻).
671.45+y [#] 14	(10 ⁻)		BC	J ^π : 268.55γ to (9 ⁻), 451.46γ to (8 ⁻); band member.
802.6+y [@] 3	(10 ⁻)		B	J ^π : 244.9γ to (9 ⁻), 582.8γ to (8 ⁻); band member.
913.45+y [‡] 15	(11 ⁻)		BC	J ^π : 241.98γ to(10 ⁻), 510.7γ to (9 ⁻); band member.
1230.2+y [@] 4	(11 ⁻)		B	J ^π : 427.6γ to (10 ⁻), 672.5γ to (9 ⁻); band member.
1241.41+y [#] 15	(12 ⁻)		BC	J ^π : 327.96γ to (11 ⁻), 569.86γ to (10 ⁻); band member.
1515.1+y [@] 5	(12 ⁻)		B	J ^π : 284.9γ to (11 ⁻), 712.5γ to (10 ⁻); band member.
1603.90+y [‡] 16	(13 ⁻)		BC	J ^π : 362.43γ to (12 ⁻), 690.56γ to (11 ⁻); band member.
1938.0+y [@] 7	(13 ⁻)		B	J ^π : 422.9γ to (12 ⁻), 707.8γ to (11 ⁻); band member.
1947.55+y [#] 17	(14 ⁻)		BC	J ^π : 343.68γ to (13 ⁻), 706.08γ to (12 ⁻); band member.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{112}Rh Levels (continued)

<u>E(level)[†]</u>	<u>J^π</u>	<u>XREF</u>	<u>Comments</u>
2433.99+y [‡] 17	(15 ⁻)	B	J ^π : 486.47γ to (14 ⁻), 830.10γ to (13 ⁻); band member.
2769.36+y [#] 18	(16 ⁻)	B	J ^π : 335.4γ to (15 ⁻), 821.77γ to (14 ⁻); band member.

[†] From a least-squares fit to Eγ.

[‡] Band(A): Member of the $\pi 7/2^+ [413] \otimes \nu 7/2^- [523], \alpha=1$ band.

[#] Band(B): Member of the $\pi 7/2^+ [413] \otimes \nu 7/2^- [523], \alpha=0$ band.

[@] Band(C): Rotational band built on the (9⁻) state at 557.7+Y keV.

Adopted Levels, Gammas (continued)

$\gamma(^{112}\text{Rh})$									
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. #	$\delta^\#$	$\alpha^@$	Comments
82.27	(1 ⁺ ,2 ⁺)	82.3 [‡] 2	100 [‡]	0.0	(1 ⁺)	M1+E2	0.45 +20-24	1.0 3	Mult., δ : from $\alpha(\text{K})\text{exp}=0.77$ 19 in 1991Jo11. Other: $\alpha(\text{K})\text{exp}=0.45$ from KX/ γ -ray ratio (1991Jo11).
327.03	(1 ⁺)	244.8 [‡] 2	32 [‡] 2	82.27	(1 ⁺ ,2 ⁺)	M1(+E2)	0.3 3	0.033 5	Mult., δ : from $\alpha(\text{K})\text{exp}=0.028$ 9 in 1991Jo11. $\alpha(\text{K})\text{exp}=0.053$ 14 from KX/ γ -ray ratio (1991Jo11).
		327.0 [‡] 2	100 [‡] 7	0.0	(1 ⁺)	M1+E2	≈ 1.9	0.0197	Mult., δ : from $\alpha(\text{K})\text{exp}=0.017$ 5 in 1991Jo11.
542.0	(1,2)	459.5 [‡] 5	100 [‡]	82.27	(1 ⁺ ,2 ⁺)				
670.2	(1)	128.0 [‡] 5	11 [‡] 3	542.0	(1,2)				
		588.1 [‡] 5	100 [‡] 12	82.27	(1 ⁺ ,2 ⁺)				
60.58+y	(7 ⁻)	60.58 10	100	0.0+y	(6 ⁺)	(E1)			Mult.: Assumed assignment from similarities with ^{110}Rh in ^{252}Cf SF decay (2004Lu03).
219.86+y	(8 ⁻)	159.16 10	100	60.58+y	(7 ⁻)	(M1+E2)			Mult.: $\alpha(\text{exp})=0.10$ 4 in ^{252}Cf SF decay (2004Lu03), assuming 60.58y is E1.
402.89+y	(9 ⁻)	183.03 10	100	219.86+y	(8 ⁻)	(M1+E2)			Mult.: $\alpha(\text{exp})=0.06$ 3 in ^{252}Cf SF decay (2004Lu03), assuming 60.58y is E1.
		342.42 10	6.6	60.58+y	(7 ⁻)				
557.7+y	(9 ⁻)	154.7 5		402.89+y	(9 ⁻)				
		337.9 5		219.86+y	(8 ⁻)				
		497.2 5		60.58+y	(7 ⁻)				
671.45+y	(10 ⁻)	268.55 10	100	402.89+y	(9 ⁻)				
		451.46 10	17	219.86+y	(8 ⁻)				
802.6+y	(10 ⁻)	244.9 5		557.7+y	(9 ⁻)				
		399.6 5		402.89+y	(9 ⁻)				
		582.8 5		219.86+y	(8 ⁻)				
913.45+y	(11 ⁻)	241.98 10	100 11	671.45+y	(10 ⁻)				I_γ : From $^{208}\text{Pb}(^{18}\text{O},\text{F}\gamma)$.
		510.7 1	29 7	402.89+y	(9 ⁻)				I_γ : From $^{208}\text{Pb}(^{18}\text{O},\text{F}\gamma)$.
1230.2+y	(11 ⁻)	427.6 5		802.6+y	(10 ⁻)				
		672.5 5		557.7+y	(9 ⁻)				
1241.41+y	(12 ⁻)	327.96 10	67	913.45+y	(11 ⁻)				
		569.86 10	100	671.45+y	(10 ⁻)				
1515.1+y	(12 ⁻)	284.9 5		1230.2+y	(11 ⁻)				
		712.5 5		802.6+y	(10 ⁻)				
1603.90+y	(13 ⁻)	362.43 10	61	1241.41+y	(12 ⁻)				
		690.56 10	100	913.45+y	(11 ⁻)				
1938.0+y	(13 ⁻)	422.9 5		1515.1+y	(12 ⁻)				
		707.8 ^{&} 5		1230.2+y	(11 ⁻)				
1947.55+y	(14 ⁻)	343.68 10	46	1603.90+y	(13 ⁻)				
		706.08 10	100	1241.41+y	(12 ⁻)				
2433.99+y	(15 ⁻)	486.47 10		1947.55+y	(14 ⁻)				
		830.10 10		1603.90+y	(13 ⁻)				
2769.36+y	(16 ⁻)	335.4 1		2433.99+y	(15 ⁻)				
		821.77 10		1947.55+y	(14 ⁻)				

Adopted Levels, Gammas (continued)

$\gamma(^{112}\text{Rh})$ (continued)

† From ^{252}Cf SF decay, unless otherwise noted.

‡ From ^{112}Ru β^- decay.

From $\alpha(\text{K})\text{exp}$ in ^{112}Ru β^- decay ([1991Jo11](#)), unless otherwise noted.

@ 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.

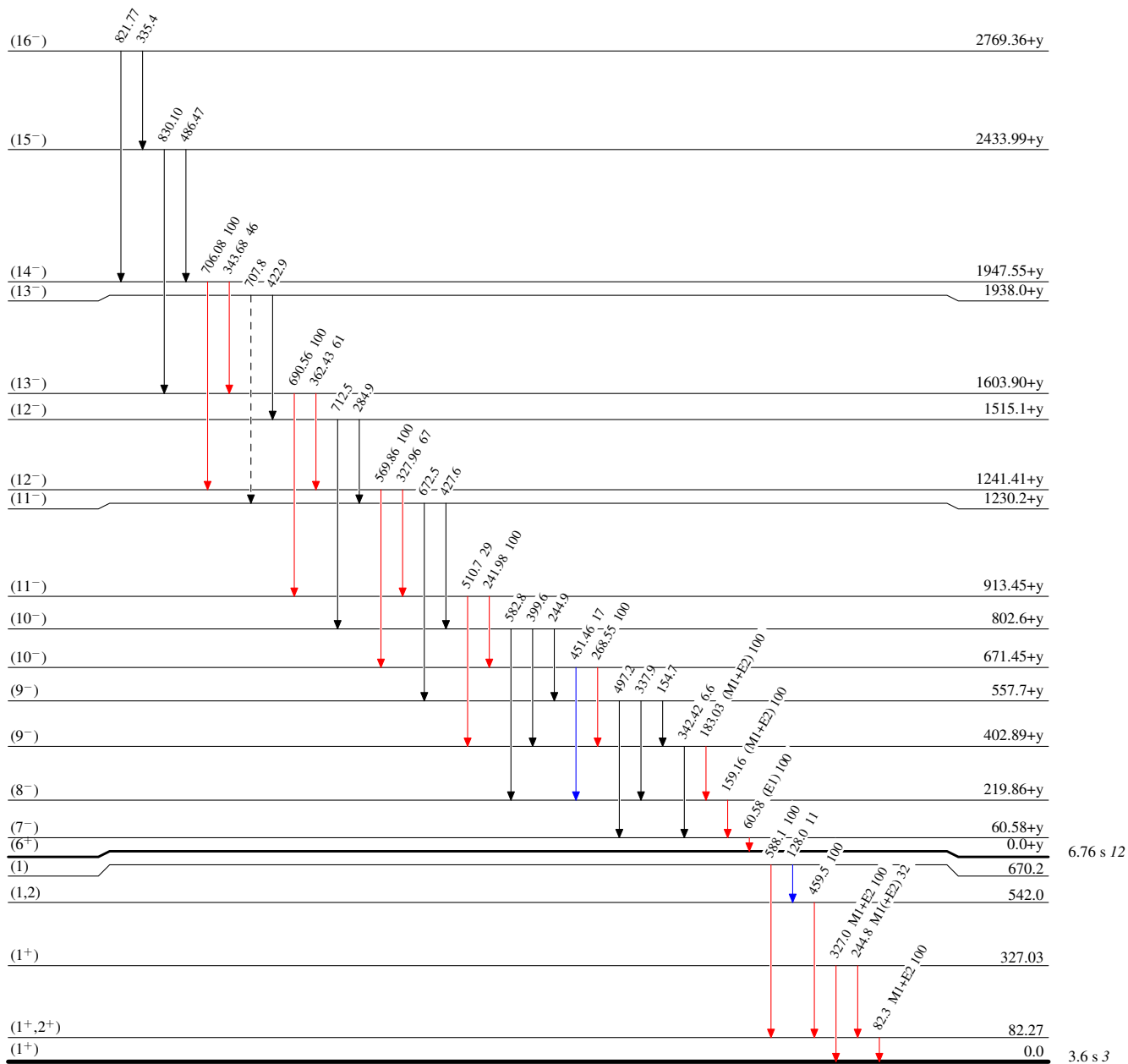
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

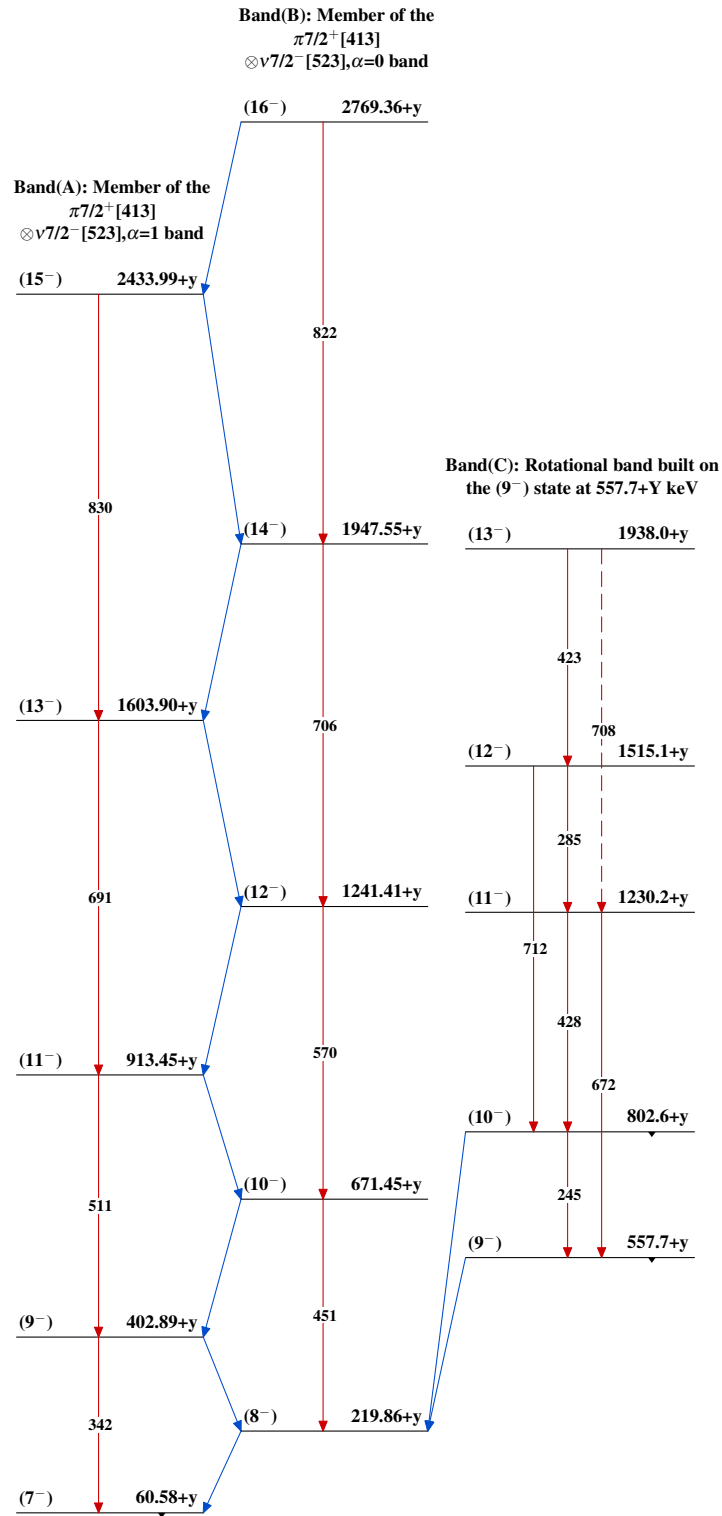
Legend

Level Scheme
 Intensities: Type not specified

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



$^{112}_{45}\text{Rh}_{67}$

Adopted Levels, Gammas $^{112}_{45}\text{Rh}_{67}$