^{187}Re(^{82}Se,^{82}Se′γ) 2003Sh13

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 110, 999 (2009)	1-Nov-2008

Target: Natural ^{187}Re; Projectile: ^{82}Se, E=500 MeV, the beam energy was about 15% higher than the Coulomb energy for the ^{82}Se+^{187}Re system; Detector: GEMINI array consists of 12 Compton-suppressed HPGe detectors; Measured: Eγ, Iγ, γγ coin, $T_{1/2}$.

^{187}Re Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0#	5/2+		
134.16# *8*	7/2+		
206.33@ *9*	9/2−	555.3 ns *17*	$T_{1/2}$: From Adopted Levels.
303.91# *8*	9/2+		
388.75@ *10*	11/2−		
508.82# *9*	11/2+		
603.58@ *11*	13/2−		
745.23# *10*	13/2+		
792.71a *11*	(13/2)		
839.66@ *12*	15/2−		
842.10& *12*	(7/2−,9/2+)		Jπ: 708γ to 7/2+ state and 842γ to 5/2+ state, both states are member of 5/2+[402] band; 453γ to 11/2− state.
1015.49# *11*	15/2+		
1034.26& *11*	(9/2−,11/2+)		
1042.67a *12*	(15/2)		
1106.86@ *12*	17/2−		
1257.41& *13*	(11/2−,13/2+)		
1310.41# *12*	17/2+		
1319.11a *13*	(17/2)		Jπ: Assigned to leading the K=(13/2) for the Band II, requiring at least 3ħ spin transfer for the 586γ.
1383.66@ *14*	19/2−		
1474.44 *13*	19/2−	<3 ns	Jπ: 367.6γ and 634.8γ feeding 17/2− and 15/2− states, respectively, members of 9/2−[514] band; and from (M1,E1) multipolarity assumptions for the 155γ and 207γ using intensity balance at this level. A possible configuration for the Kπ=19/2− state: $\pi(5/2^+[402]) \otimes \nu(3/2^-[512]11/2^+[615])_{7-}$.
1511.10& *18*	(13/2−,15/2+)		
1639.20# *15*	19/2+		
1674.06@ *17*	(21/2−)		
1681.74 *17*	(19/2+)	114 ns *23*	Jπ: or (21/2+). 207γ (E1) to 19/2− state. Kπ=19/2+ is favored from systematics by authors, a possible configuration: $\pi(9/2^-[514]) \otimes \nu(-1/2^-[510]11/2^+[615])_{5-}$. Kπ=(21/2+) configuration: $\pi(9/2^-[514]) \otimes \nu(1/2^-[510]11/2^+[615])_{6-}$. $T_{1/2}$: Determined from a time difference spectrum between the 329γ and the 215γ, 207γ, and 329γ.
1870.64 *19*			
1982.11# *18*	(21/2+)		
2199.74 *22*			

† Deduced by the evaluator, from a least-squares adjustment to the γ-rays.
‡ From rotational structure.
# 5/2+[402] Band.

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^{187}Re(^{82}Se,^{82}Se′γ) 2003Sh13 (continued)

^{187}Re Levels (continued)

[@] 9/2⁻[514] Band.
[&] Band I: possible vibrational character.
[a] Band II: possible vibrational character.

$\gamma(^{187}Re)$

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	DCO[†]	Comments
72		206.33	9/2⁻	134.16	7/2⁺			
(91)		1474.44	19/2⁻	1383.66	19/2⁻			
134.2 *1*	655 *21*	134.16	7/2⁺	0.0	5/2⁺	M1+E2[#]	0.44 *1*	
155.2 *2*	0.4 *4*	1474.44	19/2⁻	1319.11	(17/2)	D		Mult.: From the intensity balance at the 1474 keV level and intensity ratio of 155γ and 207γ assuming multipolarities for 368γ M1 and 635γ E2.
169.8 *1*	1000 *30*	303.91	9/2⁺	134.16	7/2⁺	M1+E2[#]	0.54 *1*	
182.3 *1*	7 *1*	388.75	11/2⁻	206.33	9/2⁻			
188.9 *1*	0.62 *7*	1870.64		1681.74	(19/2⁺)			
192.3 *2*	2 *1*	1034.26	(9/2⁻,11/2⁺)	842.10	(7/2⁻,9/2⁺)			
204.9 *1*	337 *10*	508.82	11/2⁺	303.91	9/2⁺			
206.2 *1*		206.33	9/2⁻	0.0	5/2⁺			
207.3 *1*	1.3 *1*	1681.74	(19/2⁺)	1474.44	19/2⁻	(E1)		Mult.: From the intensity balance at the 1474 keV level and intensity ratio of 155γ and 207γ assuming multipolarities for 368γ M1 and 635γ E2.
214.8 *1*	8 *1*	603.58	13/2⁻	388.75	11/2⁻			
223.5 *2*	2.4 *2*	1257.41	(11/2⁻,13/2⁺)	1034.26	(9/2⁻,11/2⁺)			
236.1 *1*	3.4 *2*	839.66	15/2⁻	603.58	13/2⁻		0.84 *12*	
236.4 *1*	140 *4*	745.23	13/2⁺	508.82	11/2⁺			
249.9 *1*	2.1 *2*	1042.67	(15/2)	792.71	(13/2)			
253.8 *2*	1.7 *1*	1511.10	(13/2⁻,15/2⁺)	1257.41	(11/2⁻,13/2⁺)			
267.2 *1*	2.4 *1*	1106.86	17/2⁻	839.66	15/2⁻			
270.2 *1*	45 *2*	1015.49	15/2⁺	745.23	13/2⁺		0.96 *3*	
276.4 *1*	1.5 *1*	1319.11	(17/2)	1042.67	(15/2)			
276.8 *1*	0.59 *7*	1383.66	19/2⁻	1106.86	17/2⁻			
290.4 *1*	0.49 *5*	1674.06	(21/2⁻)	1383.66	19/2⁻			
294.9 *1*	13 *1*	1310.41	17/2⁺	1015.49	15/2⁺		0.95 *2*	
304.0 *1*	173 *6*	303.91	9/2⁺	0.0	5/2⁺	E2[#]	0.80 *3*	
328.8 *1*	1.8 *1*	1639.20	19/2⁺	1310.41	17/2⁺			
329.1 *1*	0.7 *1*	2199.74		1870.64				
342.9 *1*	0.3 *1*	1982.11	(21/2⁺)	1639.20	19/2⁺			
367.6 *1*	1.9 *1*	1474.44	19/2⁻	1106.86	17/2⁻	[M1]	0.9[‡] *1*	Mult.: Assumed in 2003Sh13.
374.7 *1*	130 *4*	508.82	11/2⁺	134.16	7/2⁺			
397.5 *2*	0.7 *3*	603.58	13/2⁻	206.33	9/2⁻			
404.0 *1*	28 *1*	792.71	(13/2)	388.75	11/2⁻			
439.1 *1*	1.2 *1*	1042.67	(15/2)	603.58	13/2⁻			
441.3 *1*	86 *3*	745.23	13/2⁺	303.91	9/2⁺			
450.9 *1*	1.6 *2*	839.66	15/2⁻	388.75	11/2⁻			
453.4 *1*	1.5 *1*	842.10	(7/2⁻,9/2⁺)	388.75	11/2⁻			
503.3 *1*	1.2 *1*	1106.86	17/2⁻	603.58	13/2⁻	(Q)[@]	1.1 *1*	
506.7 *1*	37 *1*	1015.49	15/2⁺	508.82	11/2⁺			

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^{187}Re(^{82}Se,^{82}Se′γ) 2003Sh13 (continued)

γ(^{187}Re) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	DCO[†]	Comments
526.4 *1*	0.6 *1*	1319.11	(17/2)	792.71	(13/2)			
544.0 *1*	0.32 *10*	1383.66	19/2$^-$	839.66	15/2$^-$			
565.2 *1*	13 *1*	1310.41	17/2$^+$	745.23	13/2$^+$		1.1 *1*	
(567)		1674.06	(21/2$^-$)	1106.86	17/2$^-$			
586.3 *1*	5 *1*	792.71	(13/2)	206.33	9/2$^-$			
623.7 *2*	1.2 *2*	1639.20	19/2$^+$	1015.49	15/2$^+$			
634.8 *1*	0.10 *7*	1474.44	19/2$^-$	839.66	15/2$^-$	[E2]		Mult.: Assumed in 2003Sh13.
645.4 *1*	2.0 *2*	1034.26	(9/2$^-$,11/2$^+$)	388.75	11/2$^-$			
707.8 *3*	9 *1*	842.10	(7/2$^-$,9/2$^+$)	134.16	7/2$^+$			
731.2 *2*	0.7 *2*	1034.26	(9/2$^-$,11/2$^+$)	303.91	9/2$^+$			
748.6 *2*	0.7 *2*	1257.41	(11/2$^-$,13/2$^+$)	508.82	11/2$^+$			
842.1 *3*	5 *1*	842.10	(7/2$^-$,9/2$^+$)	0.0	5/2$^+$			
868.5 *2*	1.2 *1*	1257.41	(11/2$^-$,13/2$^+$)	388.75	11/2$^-$			
899.9 *2*	1.7 *1*	1034.26	(9/2$^-$,11/2$^+$)	134.16	7/2$^+$			
907.4 *2*	0.66 *10*	1511.10	(13/2$^-$,15/2$^+$)	603.58	13/2$^-$			
953.2 *4*	0.7 *3*	1257.41	(11/2$^-$,13/2$^+$)	303.91	9/2$^+$			

[†] DCO is deduced from R (ratio) = Iγ at 32° (or 148°) gated on γ at 90° to Iγ at 90° gated on γ at 32° (or 148°). Gated on ΔJ=2 (quadrupole) transition, except otherwise noted. For R(DCO)≈1.0, ΔJ=2 (quadrupole) transition and for R(DCO)≈0.5, ΔJ=1 (dipole) transition expected.

[‡] Gated on ΔJ=1 (dipole) transition.

[#] From adopted gammas, consistent with the DCO ratio value.

[@] Assigned by evaluator based on DCO ratio.

^{187}Re(^{82}Se,^{82}Se′γ) 2003Sh13

Level Scheme

Intensities: Relative I_γ

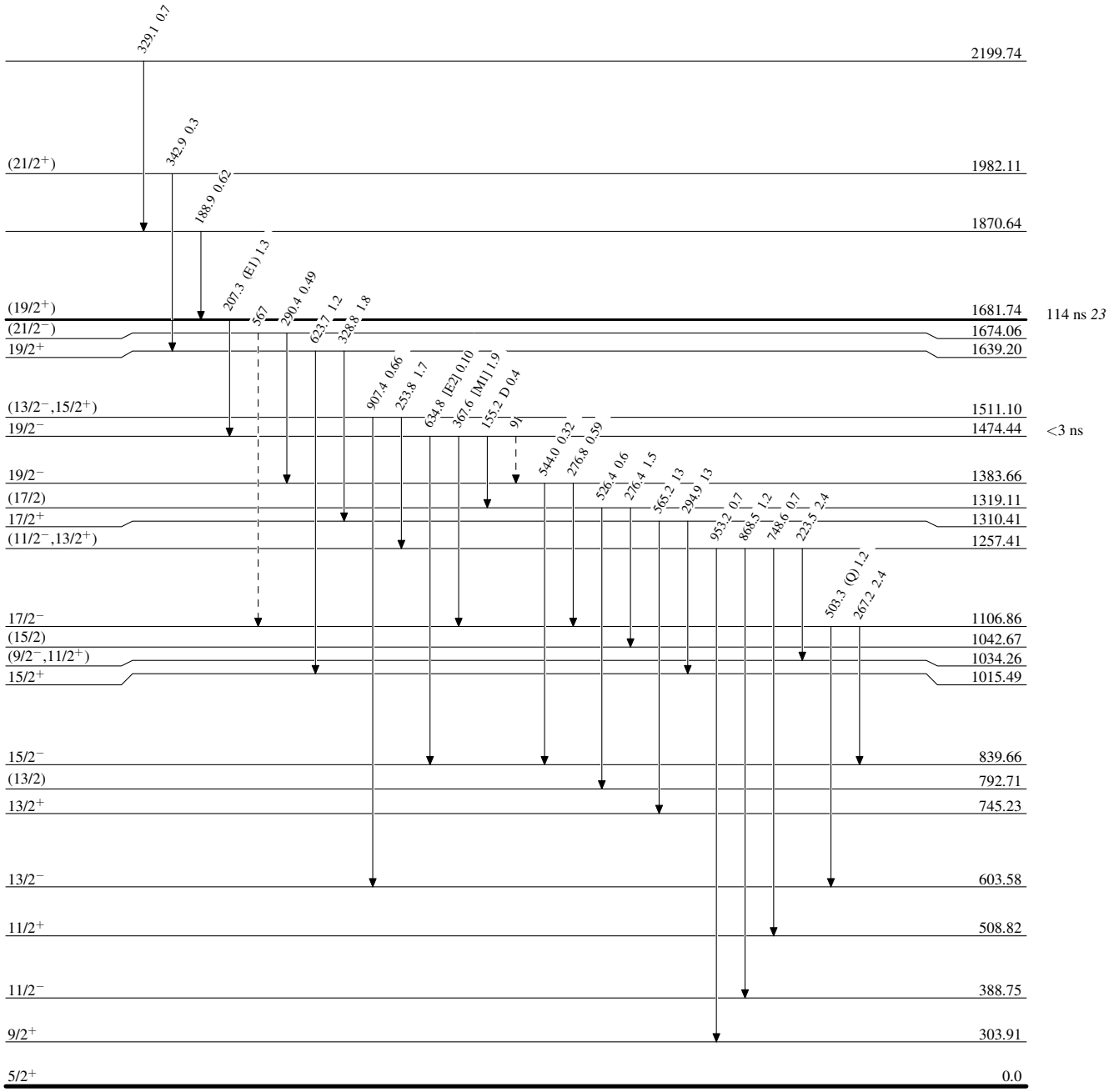
Legend

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

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

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

γ Decay (Uncertain)



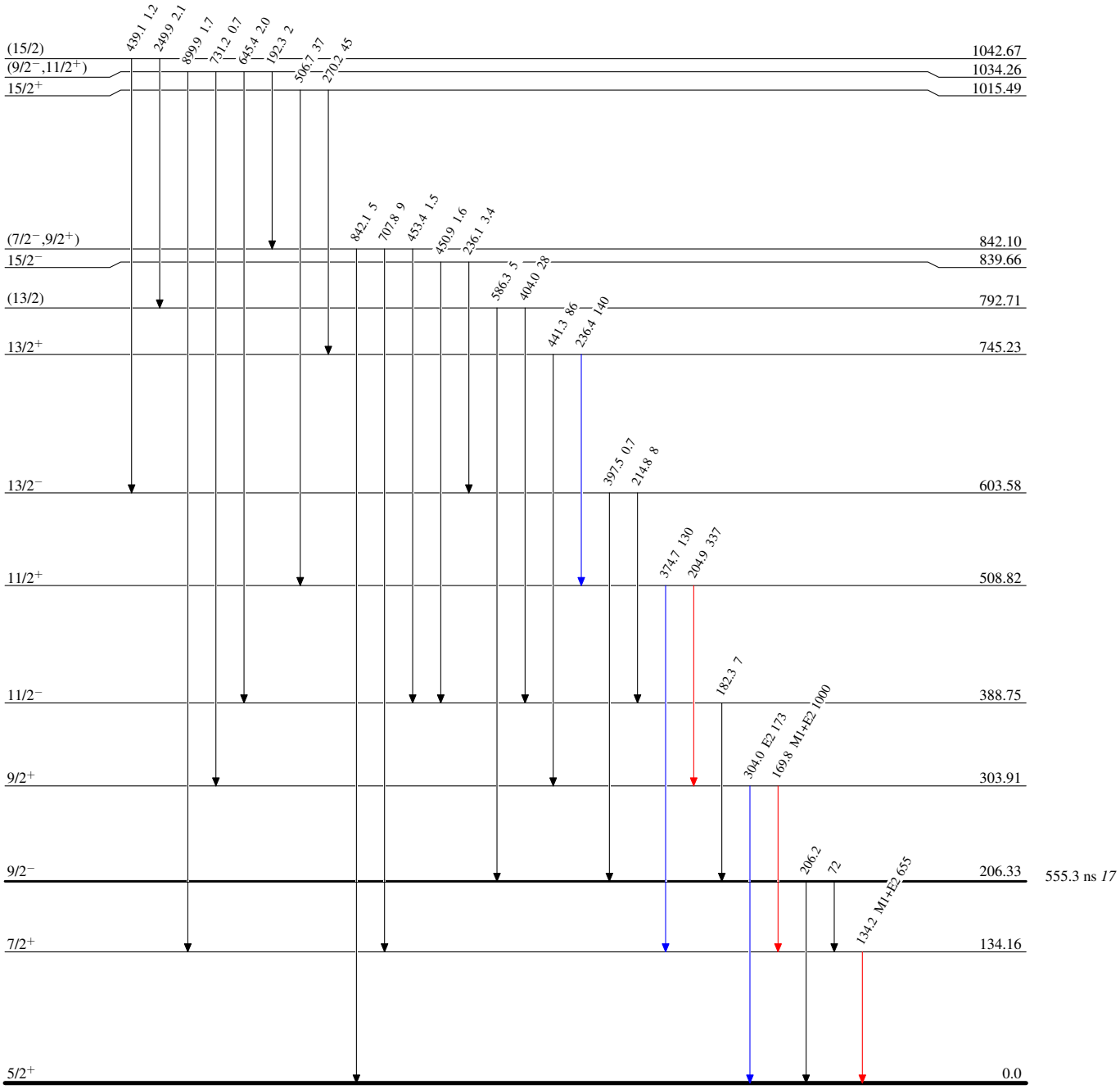
$^{187}_{75}Re_{112}$

^{187}Re(^{82}Se,^{82}Se′γ) 2003Sh13

Level Scheme (continued)

Intensities: Relative I_γ

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{187}_{75}Re_{112}$