

¹⁸⁶W(d,2n γ) 2017Ma39

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. C. Batchelder and A. M. Hurst, M. S. Basunia		NDS 183, 1 (2022)	1-Mar-2022

Adapted/Edited the XUNDL dataset compiled by by C. Smith (ORNL/UTK) and C.D. Nesaraja (ORNL) 17 November, 2015.

2017Ma39: The ¹⁸⁶Re nuclide was produced in two experiments using the ¹⁸⁶W(d,2n γ) reaction and 6-mg/cm²-thick target enriched to 80% in ¹⁸⁶W. In the first experiment, the 14UD Pelletron accelerator at ANU was used to produce a deuteron beam at energies ranging between 12 and 18 MeV. Gamma-ray singles and γ - γ -t coin measurements at 12.5 and 14.5 MeV were carried out. The CAESAR array comprising of 9 Compton-suppressed HPGe detectors and 2 unsuppressed LEPS detectors were used for these measurements. The second experiment was performed at RCNP at Osaka University using the CAGRA array that consisted of 16 clover-type HPGe detectors. γ - γ -t coincidence measurements at 14.5-MeV beam energy were carried out.

¹⁸⁶Re Levels

E(level) [†]	J π [#]	T _{1/2} [‡]	Comments
0.0	1 ⁻	3.7185 d 5	configuration: $K^\pi=1^-$, $\pi 5/2[402] \otimes \nu 3/2[512]$.
99.40 20	3 ⁻	25.5 ns 25	configuration: $K^\pi=3^-$, $\pi 5/2[402] \otimes \nu 1/2[510]$.
148.2 @	(8 ⁺)	2.0 \times 10 ⁵ y	Additional information 1 . E(level): From 2015Ma60 . The level energy was held fixed during the least-squares fit adjustment.
174.1 & 3	4 ⁻		
180.4 8	(6 ⁻)		E(level), T _{1/2} : Probably a long-lived isomeric state, associated in 1969La11 with T _{1/2} =70 μ s I that was measured by 1964Br27 . configuration: $K^\pi=6^-$, $\pi 5/2[402] \otimes \nu 7/2[503]$.
318.2 & 5	5 ⁻		
324.4 a 6	5 ⁺	17.3 ns 6	
414.8 @ 4	(9 ⁺)		
465.6 a 7	6 ⁺		
497.5 & 5	6 ⁻		
556.2 b 8	(6 ⁺)		
651.8 a 7	7 ⁺		
705.2 @ 4	(10 ⁺)		
709.9 & 6	7 ⁻		
773.8 b 10	(7 ⁺)		
796.0 c 4	(10 ⁺)		configuration: Possible $K^\pi=10^+$, $\pi 5/2[402] \otimes \nu^3(1/2[510], 3/2[512], 11/2[615])$ or $[\pi 5/2[402] \otimes \nu 11/2[615]] \otimes 2^+$ configuration.
869.4 a 8	8 ⁺		
953.4 & 7	(8 ⁻)		
1018.0 @ 5	(11 ⁺)		
1115.4 a 8	9 ⁺		
1119.6 c 4	(11 ⁺)		
1138.2 5	(11 ⁺)		
1290.7 7			
1352.6 @ 5	(12 ⁺)		
1386.6 a 9	10 ⁺		

[†] From a least-squares fit to E γ , unless otherwise stated, yielding normalized $\chi^2=0.16$.

[‡] From Adopted Levels.

[#] From [2017Ma39](#).

@ Band(A): $K^\pi=(8^+)$, $\pi 5/2[402] \otimes \nu 11/2[615]$ band.

& Band(B): $K^\pi=4^-$, $\pi 5/2[402] \otimes \nu 3/2[512]$ band.

$^{186}\text{W}(\text{d},2\text{n}\gamma)$ **2017Ma39 (continued)** ^{186}Re Levels (continued)^a Band(C): $K^\pi=5^+$, $\pi 9/2[514] \otimes \nu 1/2[510]$ band.^b Band(D): $K^\pi=(6^+)$, $\pi 9/2[514] \otimes \nu 3/2[512]$ band.^c Band(E): Band built on the $J^\pi=(10^+)$ state at 796 keV.

$\gamma(^{186}\text{Re})$							
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.	Comments
99.40	3 ⁻	99.4 2		0.0	1 ⁻		
174.1	4 ⁻	74.7 2		99.40	3 ⁻		
318.2	5 ⁻	144.0 5		174.1	4 ⁻		
324.4	5 ⁺	144.0 5	100.0 49	180.4	(6 ⁻)	E1	Mult.: From intensity balance considerations in 2017Ma39 .
		150.3 5	13.2 10	174.1	4 ⁻	E1	Mult.: From intensity balance considerations in 2017Ma39 .
414.8	(9 ⁺)	266.7 5		148.2	(8 ⁺)		
465.6	6 ⁺	141.1 5		324.4	5 ⁺		
497.5	6 ⁻	179.4 5	100	318.2	5 ⁻		
		323.5 5	13 1	174.1	4 ⁻		
556.2	(6 ⁺)	231.8 5		324.4	5 ⁺		
651.8	7 ⁺	186.1 5	100	465.6	6 ⁺		
		327.5 5	9 1	324.4	5 ⁺		
705.2	(10 ⁺)	290.4 5	58.8 69	414.8	(9 ⁺)		
		557.1 5	100	148.2	(8 ⁺)		
709.9	7 ⁻	212.7 5		497.5	6 ⁻		
		391.4 5		318.2	5 ⁻		
773.8	(7 ⁺)	217.6 5		556.2	(6 ⁺)		
796.0	(10 ⁺)	381.2 5	50 5	414.8	(9 ⁺)		
		647.6 5	100	148.2	(8 ⁺)		
869.4	8 ⁺	217.5 5	100	651.8	7 ⁺		
		403.8 5	22 2	465.6	6 ⁺		
953.4	(8 ⁻)	243 [‡] 1		709.9	7 ⁻		ΔE : 1-keV uncertainty assumed by evaluators for tentative γ .
		455.9 5		497.5	6 ⁻		
1018.0	(11 ⁺)	312.7 5	26 13	705.2	(10 ⁺)		
		603.3 5	100	414.8	(9 ⁺)		
1115.4	9 ⁺	246.0 5	100	869.4	8 ⁺		
		463.7 5	51 4	651.8	7 ⁺		
1119.6	(11 ⁺)	323.4 5		796.0	(10 ⁺)		
		414.3 5		705.2	(10 ⁺)		
		705.2 5		414.8	(9 ⁺)		
1138.2	(11 ⁺)	433.0 5		705.2	(10 ⁺)		
		723.3 5		414.8	(9 ⁺)		
1290.7		494.7 5		796.0	(10 ⁺)		
1352.6	(12 ⁺)	334.5 5		1018.0	(11 ⁺)		
		647.5 5		705.2	(10 ⁺)		
1386.6	10 ⁺	271.2 5	100	1115.4	9 ⁺		
		517.1 5	69 6	869.4	8 ⁺		

[†] From [2017Ma39](#). I_γ are % photon branching from each level.[‡] Placement of transition in the level scheme is uncertain.

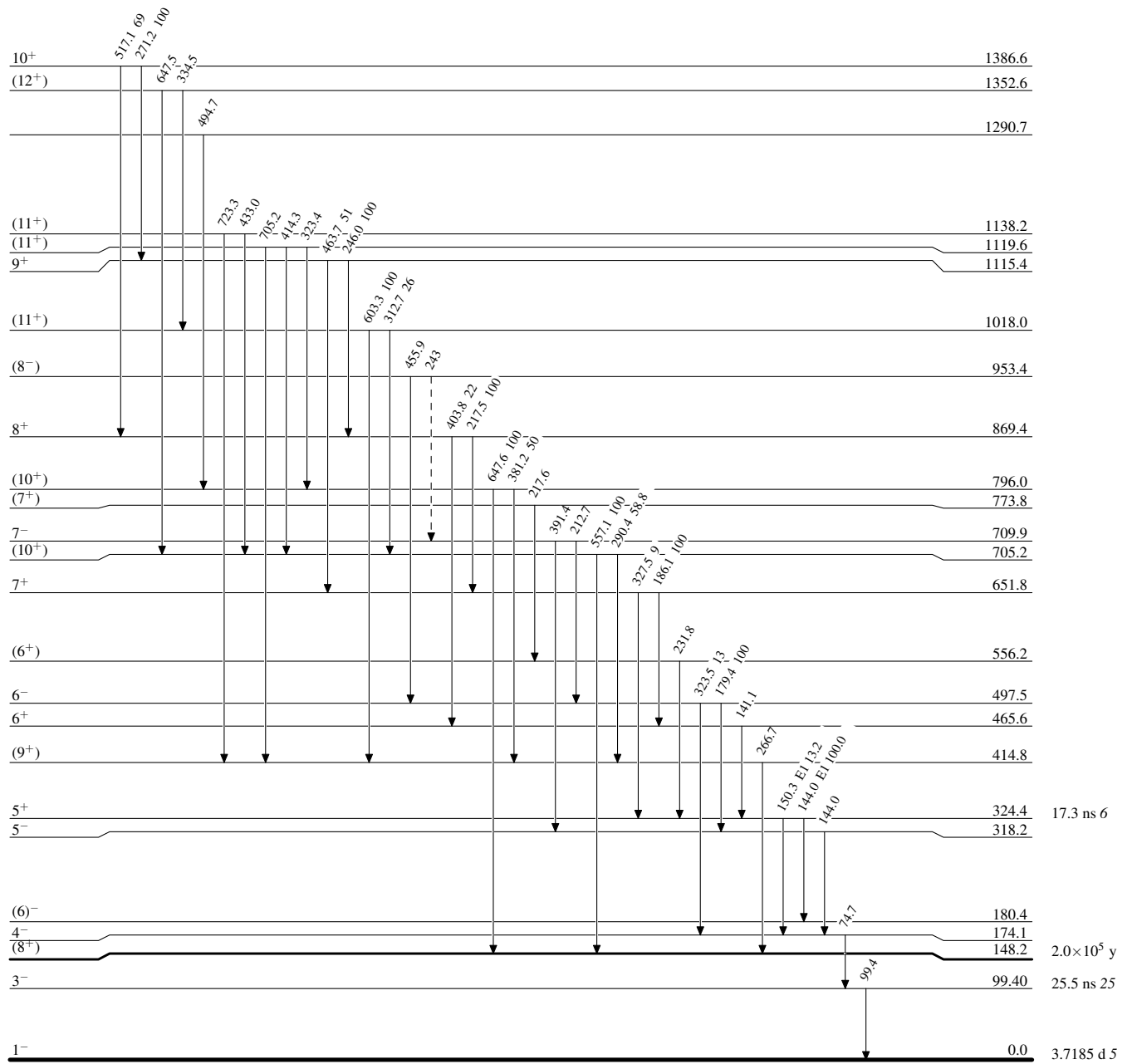
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Legend

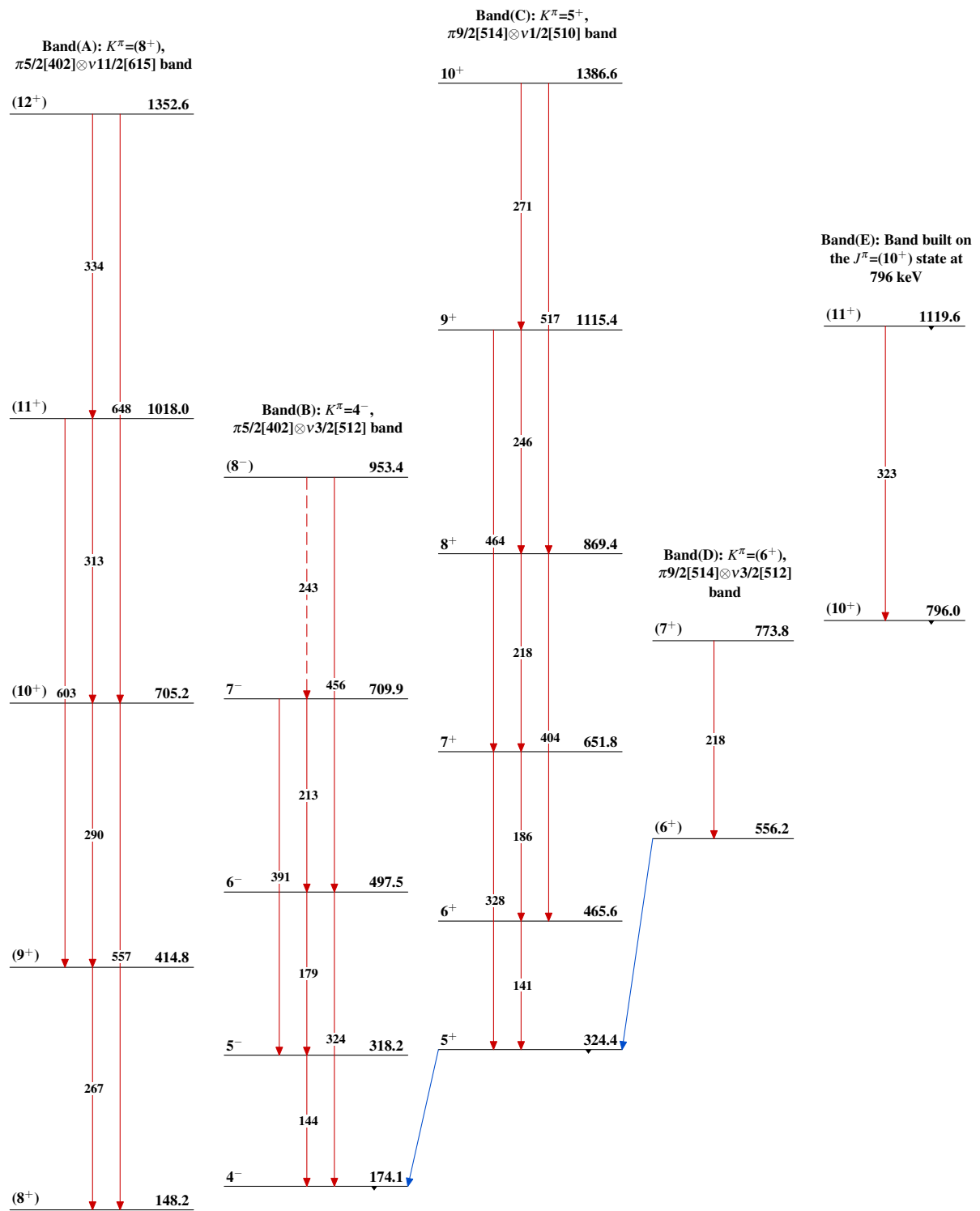
Level Scheme

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)



$^{186}_{75}\text{Re}_{111}$

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