^{181}Ta(α,2nγ) 1968Ne01,1974Si14,1983Av06

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

Others: 1966Em02, 1968Io01, 1988BeYU.
1966EmO2: E(α)=22-38 MeV (see ^{183}Re IT decay (1.04 ms) dataset).
1968Ne01: E(α)=19.8-38 MeV; measured Eγ, Iγ (Ge(Li), 28 MeV); $\gamma\gamma$ coin; $\gamma(\theta)$, ce spectra (single-gap electron spectrometer), excit.
1974Si14: E(α)=25-63 MeV; Ge(Li) (FWHM=3.5 keV At 1 MeV); measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma(\theta)$ (θ(lab)=55°, 70°, 90°), excit.
1983Av06: E(α)=16-30 MeV.
1988BeYU: E(α)=28-32 MeV; measured γ(t).

^{183}Re Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0[#]	5/2$^+$		
114.43[#] *7*	7/2$^+$		
259.72[#] *11*	9/2$^+$		
435.18[#] *13*	11/2$^+$		
496.21[@] *17*	9/2$^-$	7.9 ns *4*	$T_{1/2}$: from 1988BeYU. Other: 7 ns *1* (1974Si14).
599.02[&] *25*	5/2$^-$	1.96 ns *5*	$T_{1/2}$: from 1988BeYU (stated E(level)=899 presumed to be in error). Other values: 2.0 ns *1* (1974Ma26) and 2.1 ns *2* (1974Si14).
619.1[&] *3*	9/2$^-$		From ^{183}Os ε decay (13 h).
639.02[#] *15*	13/2$^+$		
664.15[@] *20*	11/2$^-$		
760.9[&] *4*	13/2$^-$		
851.2 *5*	7/2$^+$		This level was identified as the 7/2$^+$ member of the 7/2[404] rotational band observed in decay. The γ ray branching ratios disagree substantially with those observed in decay.
861.19[@] *22*	13/2$^-$		
870.39[#] *17*	15/2$^+$		
1024.2[&] *4*	17/2$^-$		
1084.68[@] *22*	15/2$^-$		
1127.13[#] *22*	17/2$^+$		
1334.95[@] *25*	17/2$^-$		
1404.2[&] *6*	21/2$^-$		
1409.40[#] *24*	19/2$^+$		
1608.5[@] *3*	19/2$^-$		
1713.8[#] *3*	21/2$^+$		
1893.2[&] *8*	25/2$^-$		
1907.7 *3*	(25/2)$^+$	1.04 ms *4*	$T_{1/2}$: weighted average of 1.02 ms *6* (1966Em02) and 1.05 ms *6* (1981Av04). Other value 0.90 ms *18* (1968Io01).
2039.7[#] *4*	23/2$^+$		

[†] From least-squares fit to Eγ.
[‡] As proposed by 1974Si14 based on $\gamma(\theta)$ measurements.
[#] Band(A): π 5/2[402] band.
[@] Band(B): π 9/2[514] band.
[&] Band(C): π 1/2[541] band.

$\gamma(^{183}Re)$

E_γ ‡	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. @	δ &	α †	Comments
(20.1 *4*)		619.1	9/2$^-$	599.02	5/2$^-$	[E2]		8.2×10^3 *9*	E_γ: from level-energy difference.
114.48 *7*	54.5 *10*	114.43	7/2$^+$	0.0	5/2$^+$	D+Q			Mult.: A_2=−0.056 *14*, A_4=+0.013 *14* (1968Ne01); A_2=+0.01 *5*, A_4=+0.18 *4* (1974Si14).
141.79 *18*	10.5 *10*	760.9	13/2$^-$	619.1	9/2$^-$	Q			Mult.: A_2=+0.38 *10* (1974Si14).
145.31 *11*	21.4 *10*	259.72	9/2$^+$	114.43	7/2$^+$	D+Q	0.12 *+6−12*		Mult.: A_2=+0.032 *25*, A_4=−0.007 *25* (1968Ne01); A_2=−0.15 *10*, A_4=+0.05 *5* (1974Si14). .
167.90[a] *11*	25.3 *5*	664.15	11/2$^-$	496.21	9/2$^-$	D+Q	0.16 *+2−3*		Mult.: A_2=−0.003 *20*, A_4=+0.011 *20* (1968Ne01); A_2=−0.05 *2*, A_4=−0.03 *5* (1974Si14).
175.38 *9*	27.4 *5*	435.18	11/2$^+$	259.72	9/2$^+$	D+Q	0.15 *3*		Mult.: A_2=−0.007 *20*, A_4=+0.008 *20* (1968Ne01); A_2=0.00 *5*, A_4=+0.20 *8* (1974Si14).
193.89 *16*	18.3 *7*	1907.7	(25/2)$^+$	1713.8	21/2$^+$				Mult.: A_2=+0.08 *5*, A_4=0.10 *5* (1974Si14).
197.05[a] *15*	24.0 *5*	861.19	13/2$^-$	664.15	11/2$^-$	D+Q	0.14 *3*		Mult.: A_2=−0.010 *23*, A_4=+0.038 *23* (1968Ne01); A_2=−0.09 *4*, A_4=0.00 *5* (1974Si14).
203.73 *10*	100.0 *22*	639.02	13/2$^+$	435.18	11/2$^+$	D+Q	0.14 *+3−4*		Mult.: A_2=−0.016 *30*, A_4=−0.020 *30* (1968Ne01); A_2=−0.05 *5*, A_4=+0.09 *8* (1974Si14).
223.48[a] *11*	15.8 *5*	1084.68	15/2$^-$	861.19	13/2$^-$	D+Q	0.11 *+3−5*		Mult.: A_2=−0.034 *24*, A_4=−0.041 *25* (1968Ne01); A_2=−0.09 *5*, A_4=0.00 *8* (1974Si14).
231.29 *11*	16.3 *5*	870.39	15/2$^+$	639.02	13/2$^+$	D+Q	0.10 *+4−10*		Mult.: A_2=−0.08 *4*, A_4=0.00 *5* (1968Ne01); A_2=−0.08 *5*, A_4=0.00 *5* (1974Si14).
236.2 *3*		496.21	9/2$^-$	259.72	9/2$^+$	D			E_γ: from 1968Ne01. I_γ: I(236γ):I(382γ)=4.1 *6*:115 *15* (1968Ne01). Mult.: A_2=−0.09 *13*, A_4=−0.17 *13* (1968Ne01).
250.09[a] *14*	12.5 *8*	1334.95	17/2$^-$	1084.68	15/2$^-$	D+Q	0.10 *+4−10*		Mult.: A_2=−0.13 *6*, A_4=+0.03 *6* (1968Ne01); A_2=−0.01 *8*, A_4=−0.03 *5* (1974Si14).
256.43 *21*	12 *2*	1127.13	17/2$^+$	870.39	15/2$^+$	D+Q	0.14 *+5−10*		Mult.: A_2=−0.015 *40*, A_4=−0.06 *4* (1968Ne01); A_2=+0.06 *8*, A_4=+0.02 *7* (1974Si14).
258.8 *3*	7 *2*	259.72	9/2$^+$	0.0	5/2$^+$	Q			Mult.: A_2=+0.15 *10*, A_4=−0.10 *5* (1974Si14).
263.33 *13*	18.9 *10*	1024.2	17/2$^-$	760.9	13/2$^-$	Q			Mult.: A_2=+0.23 *4*, A_4=−0.14 *4* (1968Ne01); A_2=+0.23 *8* (1974Si14).
273.35 *18*	7.1 *5*	1608.5	19/2$^-$	1334.95	17/2$^-$	D+Q	0.33 *+14−19*		Mult.: A_2=+0.10 *9*, A_4=−0.06 *9* (1968Ne01); A_2=−0.15 *10*, A_4=−0.10 *10* (1974Si14).
282.20 *18*	8.7 *5*	1409.40	19/2$^+$	1127.13	17/2$^+$	D+Q	0.39 *+20−39*		Mult.: A_2=+0.06 *12*, A_4=−0.18 *13* (1968Ne01); A_2=+0.11 *10*, A_4=−0.05 *10* (1974Si14).
[x]288.5 *3*	10.0 *2*					D+Q			Mult.: A_2=−0.19 *10*, A_4=−0.10 *10* (1974Si14).
304.45 *15*	13.3 *10*	1713.8	21/2$^+$	1409.40	19/2$^+$	D+Q	0.27 *+8−11*		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=+0.10 *4*, A_4=−0.02 *5* (1968Ne01); A_2=+0.03 *8*, A_4=−0.03 *5* (1974Si14).
320.92 *17*	7.3 *5*	435.18	11/2$^+$	114.43	7/2$^+$	Q			Mult.: A_2=+0.19 *6*, A_4=−0.14 *7* (1968Ne01); A_2=+0.15 *10*, A_4=−0.10 *10* (1974Si14).
325.71 *26*	1.6 *5*	2039.7	23/2$^+$	1713.8	21/2$^+$	D+Q			Mult.: A_2=−0.09 *5* (1974Si14).
[x]350.6 *4*	6.5 *5*								Mult.: A_2=+0.25 *10* (1974Si14). Possibly the known 1763 to 1413 transition, but none of the gammas known to deexcite the 1413 level is reported In (α,2nγ).

^{181}Ta(α,2nγ) 1968Ne01,1974Si14,1983Av06 (continued)

$\gamma(^{183}Re)$ (continued)

E_γ ‡	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. @	α †	Comments
365.20 *25*	2.1 *5*	861.19	13/2$^-$	496.21	9/2$^-$	Q		Mult.: A_2=+0.72 *20* (1974Si14).
380.0 *4*	15.7 *10*	639.02	13/2$^+$	259.72	9/2$^+$	Q		Mult.: A_2=+0.12 *10* (1974Si14).
380.0 *4*	15.7 *10*	1404.2	21/2$^-$	1024.2	17/2$^-$	Q		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=+0.12 *10* (1974Si14).
381.88 *19*	83.0 *10*	496.21	9/2$^-$	114.43	7/2$^+$	D		Mult.: A_2=−0.054 *10*, A_4=−0.008 *10* (1968Ne01); A_2=−0.07 *2*, A_4=−0.05 *3* (1974Si14).
420.48 *11*	4.6 *5*	1084.68	15/2$^-$	664.15	11/2$^-$	Q		Mult.: A_2=+0.33 *17*, A_4=−0.39 *18* (1968Ne01); A_2=0.00 *15* (1974Si14).
435.45 *20*	12.3 *5*	870.39	15/2$^+$	435.18	11/2$^+$	Q		Mult.: A_2=+0.24 *10*, A_4=−0.15 *11* (1968Ne01); A_2=+0.25 *5* (1974Si14).
474.2 *3*	3.0 *5*	1334.95	17/2$^-$	861.19	13/2$^-$	E2	0.0250	Mult.: A_2=−0.06 *15* (1974Si14).
484.59 *24*	31.0 *5*	599.02	5/2$^-$	114.43	7/2$^+$	D		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=−0.03 *3*, A_4=+0.03 *3* (1968Ne01); A_2=−0.03 *2* (1974Si14).
488.2 *3*	9.0 *8*	1127.13	17/2$^+$	639.02	13/2$^+$	Q		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=+0.35 *10* (1974Si14).
489.0 *5*	8.0 *8*	1893.2	25/2$^-$	1404.2	21/2$^-$	Q		E_γ: from 1974Si14. Mult.: A_2=+0.35 *10* (1974Si14).
496.4 *7*		496.21	9/2$^-$	0.0	5/2$^+$			E_γ,I_γ: from 1968Ne01. I(496γ):I(382γ)=1.1 *3*:115 *15* (1968Ne01).
[x]503.4 *4*	2.5 *5*					D+Q		Mult.: A_2=−0.45 *10* (1974Si14).
524.5 *4*	5.3 *5*	1608.5	19/2$^-$	1084.68	15/2$^-$	(Q)		Mult.: A_2=0.0 *4*, A_4=−0.2 *4* (1968Ne01).
539.32 *23*	10.0 *5*	1409.40	19/2$^+$	870.39	15/2$^+$	Q		Mult.: A_2=+0.31 *15*, A_4=+0.07 *15* (1968Ne01); A_3=+0.16 *3* (1974Si14).
586.1 *4*	11.0 *5*	1713.8	21/2$^+$	1127.13	17/2$^+$	(Q)		Mult.: A_2=+0.07 *12*, A_4=−0.17 *13* (1968Ne01); A_2=+0.17 *3* (1974Si14).
630.7 *4*	5.4 *5*	2039.7	23/2$^+$	1409.40	19/2$^+$	(Q)		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=+0.05 *15* (1974Si14).
[x]678.9 *3*	4.0 *5*					D+Q		E_γ: weighted average from 1968Ne01 and 1974Si14. Mult.: A_2=−0.18 *5* (1974Si14). 1974Si14's placement from an otherwise unknown 2393 level In the 5/2[402] band is inconsistent with Adopted Levels, Gammas and is rejected by the evaluator. IT might deexcite a known 1763 level.
737.0 *6*	1.7[b] *5*	851.2	7/2$^+$	114.43	7/2$^+$			E_γ: from 1974Si14.
851.0 *6*	2.5[b] *5*	851.2	7/2$^+$	0.0	5/2$^+$			E_γ: from 1974Si14.

† Additional information 1.
‡ Weighted average of data from 1968Ne01, 1974Si14, 1983Av06, except As noted. Data from these three sources are In excellent agreement.
# Relative intensity for Eα=27 MeV from 1974Si14, except As noted. 1968Ne01 report Iγ for Eα=28 MeV and 1983Av06 for Eα=20, 25 and 30 MeV. branching deduced from these five sets of intensities are In poor to fair agreement.
@ From $\gamma(\theta)$ (1968Ne01 and/or 1974Si14).
& From $\gamma(\theta)$ (1968Ne01).
[a] Transition was observed by 1974Si14 to contain a 21 ns *2* component.
[b] Iγ(737)/Iγ(851)=0.68 *24* (1974Si14) compared with an adopted value of 0.061 *3*; also, two known weaker branches from the 851 level were not observed by 1974Si14.
[x] γ ray not placed in level scheme.

$^{183}_{75}Re_{108}$-3

^{181}Ta(α,2nγ) 1968Ne01,1974Si14,1983Av06

Level Scheme

Intensities: Relative I_γ

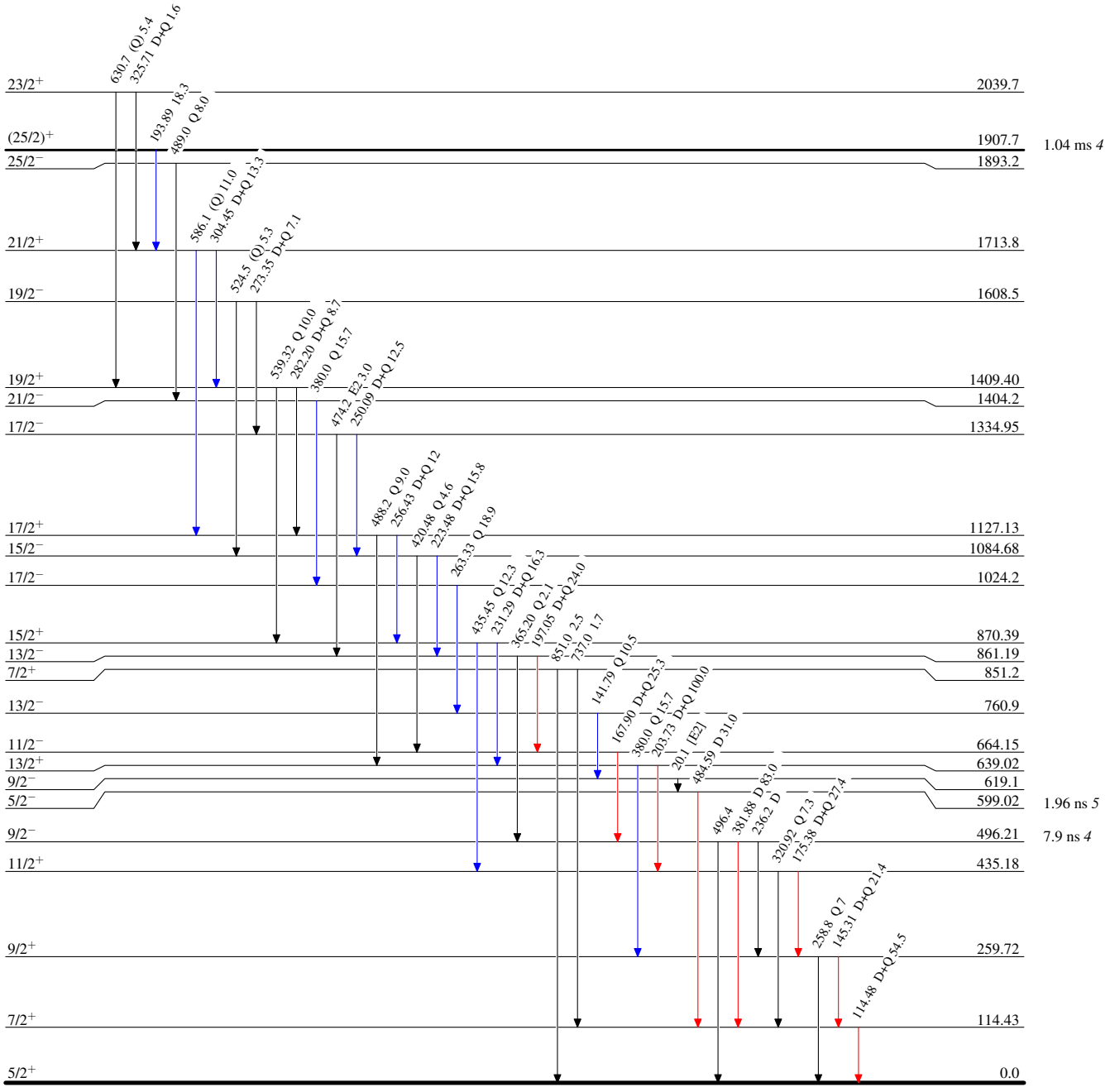
Legend

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

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

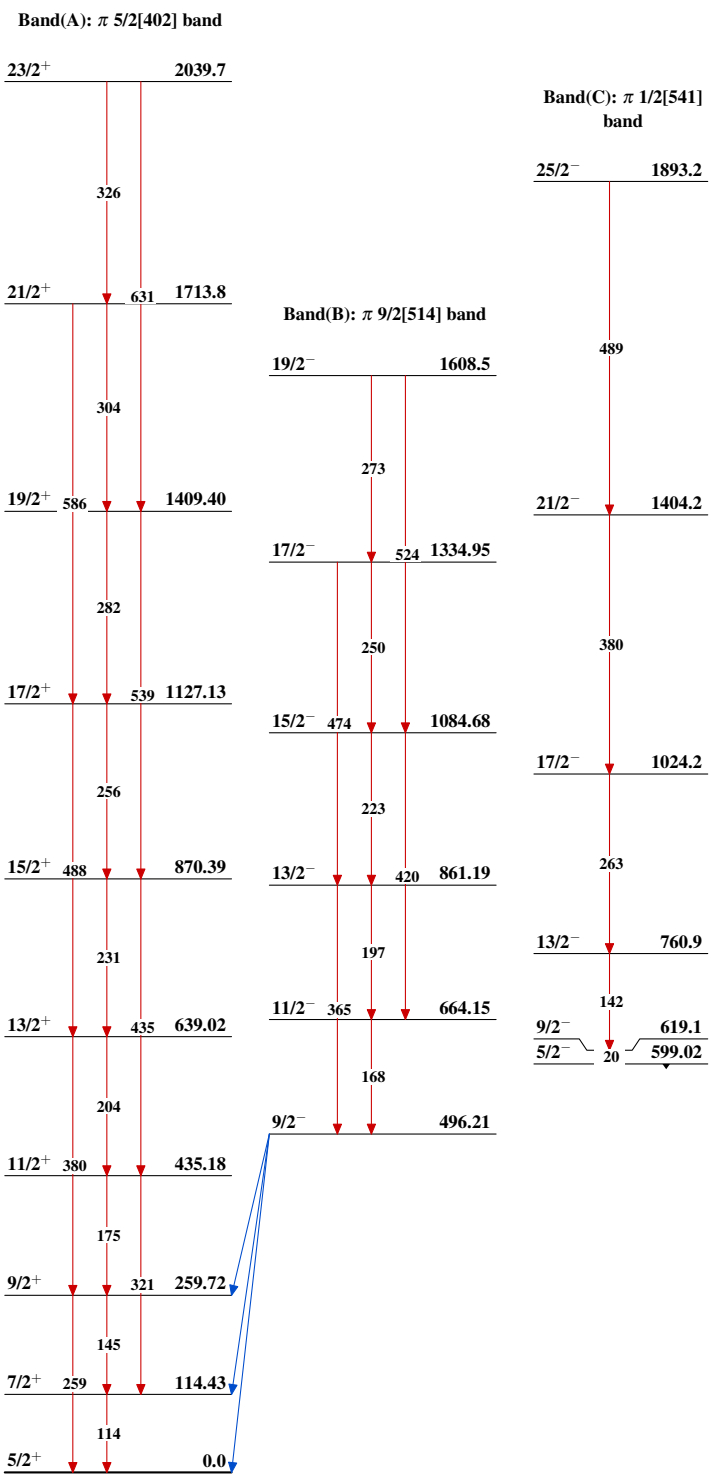
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{183}_{75}Re_{108}$

^{181}Ta(α,2nγ) 1968Ne01,1974Si14,1983Av06



$^{183}_{75}Re_{108}$