$^{181}Ta(^{18}O,^{16}O\gamma)$ 2009Sh17

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

Two-neutron transfer reaction carried out at the Tokai tandem accelerator, Japan Atomic Energy Agency. E=180 MeV; natural self-supporting target 3.9 mg/cm^2 thick; ions were detected with four sets of Si surface barrier detectors and emitted γ-rays were detected using 8 HPGe detectors; measured ion energy, Eγ, Iγ, $\gamma\gamma$ coin, asymmetry ratio.

^{183}Ta Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	Comments
0.0[#]	7/2$^+$		
73.6[@] *1*	(9/2)$^-$	101 ns *20*	T$_{1/2}$: from (particle)-γ(t) (2009Sh17).
143.60[#] *9*	9/2$^+$		
231.82[@] *14*	(11/2)$^-$		
317.30[#] *9*	11/2$^+$		
417.50[@] *16*	(13/2)$^-$		
459.2[&] *1*	(5/2$^+$)		
520.31[#] *13*	13/2$^+$		
573.40[&] *15*	(7/2$^+$)		
629.74[@] *18*	(15/2)$^-$		
717.50[&] *18*	(9/2$^+$)		
749.9[#] *5*	15/2$^+$		
868.12[@] *20*	(17/2)$^-$		
890.67[&] *25*	(11/2$^+$)		
906.29[a] *14*	(13/2$^-$)		
1092.0[&] *3*	(13/2$^+$)		
1102.78[a] *15*	(15/2$^-$)		
1130.42[@] *23*	(19/2)$^-$		
1310.60[a] *18*	(17/2$^-$)		
1310.60+x		0.9 μs *3*	%IT=100
1320.0[&] *4*	(15/2$^+$)		
1455.4+x *1*			
1565.2+x *10*			

[†] From least-squares fit to Eγ.
[‡] Authors′ suggested values; based on deduced band structure.
[#] Band(A): π 7/2[404] band.
[@] Band(B): π 9/2[514] band.
[&] Band(C): π 5/2[402] band.
[a] Band(D): sequence based on (13/2$^-$) 906. Probable K+2 γ-vibrational state coupled to 9/2[514].

$\gamma(^{183}$Ta)

E$_\gamma$	E$_i$(level)	E$_f$	J$^\pi_f$	Comments
x	1310.60+x	1310.60	(17/2$^-$)	E$_\gamma$: x<50 keV for M1 or <100 keV for M1 or E2 G. Due to high internal conversion and low detection efficiency, a gamma ray of this energy could not have been detected in this experiment.

Continued on next page (footnotes at end of table)

$^{181}Ta(^{18}O,^{16}O\gamma)$ 2009Sh17 (continued)

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

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	Comments
73.6 *1*	41 *4*	73.6	(9/2)⁻	0.0	7/2⁺	Q(+D)	Mult.: R(asym)=1.0 *1* implies Q or D+Q multipolarity.
114.2 *1*	6 *2*	573.40	(7/2⁺)	459.2	(5/2⁺)	Q(+D)	Mult.: R(asym)=1.1 *1* implies Q or D+Q multipolarity.
143.6 *1*	21 *4*	143.60	9/2⁺	0.0	7/2⁺		Mult.: R(asym)=1.1 *1* for 143.6+144.1 doublet.
144.1 *1*	10 *2*	717.50	(9/2⁺)	573.40	(7/2⁺)		Mult.: R(asym)=1.1 *1* for 143.6+144.1 doublet.
144.8 *1*	≈2	1455.4+x		1310.60+x			Mult.: R(asym)=1.1 *1* for 144.8+144.1 doublet.
158.3 *1*	100 *6*	231.82	(11/2)⁻	73.6	(9/2)⁻	Q(+D)	Mult.: R(asym)=1.0 *1* implies Q or D+Q multipolarity.
173.0 *2*	6 *2*	890.67	(11/2⁺)	717.50	(9/2⁺)		Mult.: R(asym)=1.2 *1* for 173.7+173.0 doublet.
173.7 *1*	37 *4*	317.30	11/2⁺	143.60	9/2⁺		Mult.: R(asym)=1.2 *1* for 173.7+173.0 doublet.
185.7 *1*	65 *4*	417.50	(13/2)⁻	231.82	(11/2)⁻	Q(+D)	Mult.: R(asym)=1.1 *1* implies Q or D+Q multipolarity.
196.4 *1*	5 *2*	1102.78	(15/2⁻)	906.29	(13/2⁻)	D+Q	Mult.: R(asym)=0.8 *2*.
201.2 *2*	10 *2*	1092.0	(13/2⁺)	890.67	(11/2⁺)		Mult.: R(asym)=1.0 *3* for 201.2+203.0 doublet.
203.0 *1*	6 *2*	520.31	13/2⁺	317.30	11/2⁺		Mult.: R(asym)=1.0 *3* for 203.0+201.2 doublet.
207.8 *1*	21 *2*	1310.60	(17/2⁻)	1102.78	(15/2⁻)	Q(+D)	Mult.: R(asym)=1.0 *2* implies Q or D+Q multipolarity.
212.3 *1*	30 *3*	629.74	(15/2)⁻	417.50	(13/2)⁻	Q(+D)	Mult.: R(asym)=1.0 *1* implies Q or D+Q multipolarity.
228.0 *3*	≈2	1320.0	(15/2⁺)	1092.0	(13/2⁺)		Mult.: R(asym)=1.1 *3* for 228.0+229.3 doublet.
229.3 *6*	4 *1*	749.9	15/2⁺	520.31	13/2⁺		Mult.: R(asym)=1.1 *3* for 229.3+228.0 doublet.
238.4 *1*	10 *2*	868.12	(17/2)⁻	629.74	(15/2)⁻		
254.6 *10*	4 *2*	1565.2+x		1310.60+x			
262.3 *1*	6 *2*	1130.42	(19/2)⁻	868.12	(17/2)⁻		
317.3 *1*	22 *11*	317.30	11/2⁺	0.0	7/2⁺	Q	Mult.: R(asym)=1.5 *1*.
344.0 *3*	6 *2*	417.50	(13/2)⁻	73.6	(9/2)⁻	Q	Mult.: R(asym)=1.4 *2*.
374.9 *3*	4 *2*	1092.0	(13/2⁺)	717.50	(9/2⁺)		Mult.: R(asym)=1.9 *9* for 374.9+376.8 doublet.
376.8 *10*	5 *3*	520.31	13/2⁺	143.60	9/2⁺		Mult.: R(asym)=1.9 *9* for 376.8+374.9 doublet.
397.7 *3*	4 *2*	629.74	(15/2)⁻	231.82	(11/2)⁻	Q	Mult.: R(asym)=1.5 *2*.
404.4 *10*	<1	1310.60	(17/2⁻)	906.29	(13/2⁻)		
432.8 *6*	6 *2*	749.9	15/2⁺	317.30	11/2⁺	Q	Mult.: R(asym)=2.2 *6*.
450.0 *5*	2 *1*	868.12	(17/2)⁻	417.50	(13/2)⁻	Q	Mult.: R(asym)=2.8 *7*.
459.2 *1*	8 *4*	459.2	(5/2⁺)	0.0	7/2⁺		
501.0 *9*	2 *1*	1130.42	(19/2)⁻	629.74	(15/2)⁻	Q	Mult.: R(asym)=2.6 *7*.
682.2 *10*	<1	1310.60	(17/2⁻)	629.74	(15/2)⁻		
685.2 *3*	3 *2*	1102.78	(15/2⁻)	417.50	(13/2)⁻		
832.6 *1*	29 *5*	906.29	(13/2⁻)	73.6	(9/2)⁻	(Q)	Mult.: R(asym)=1.3 *2*.
871.3 *2*	9 *3*	1102.78	(15/2⁻)	231.82	(11/2)⁻	Q	Mult.: R(asym)=1.6 *2*.
893.0 *10*	5 *2*	1310.60	(17/2⁻)	417.50	(13/2)⁻	Q	Mult.: R(asym)=1.7 *3*.

† From asymmetry ratio R(asym)=Iγ(in−plane)/Iγ(out−of−plane); expected ratios are >1 for stretched Q, 0.5 for stretched D, ≈1 for ΔJ=1, D+Q transitions with small δ.

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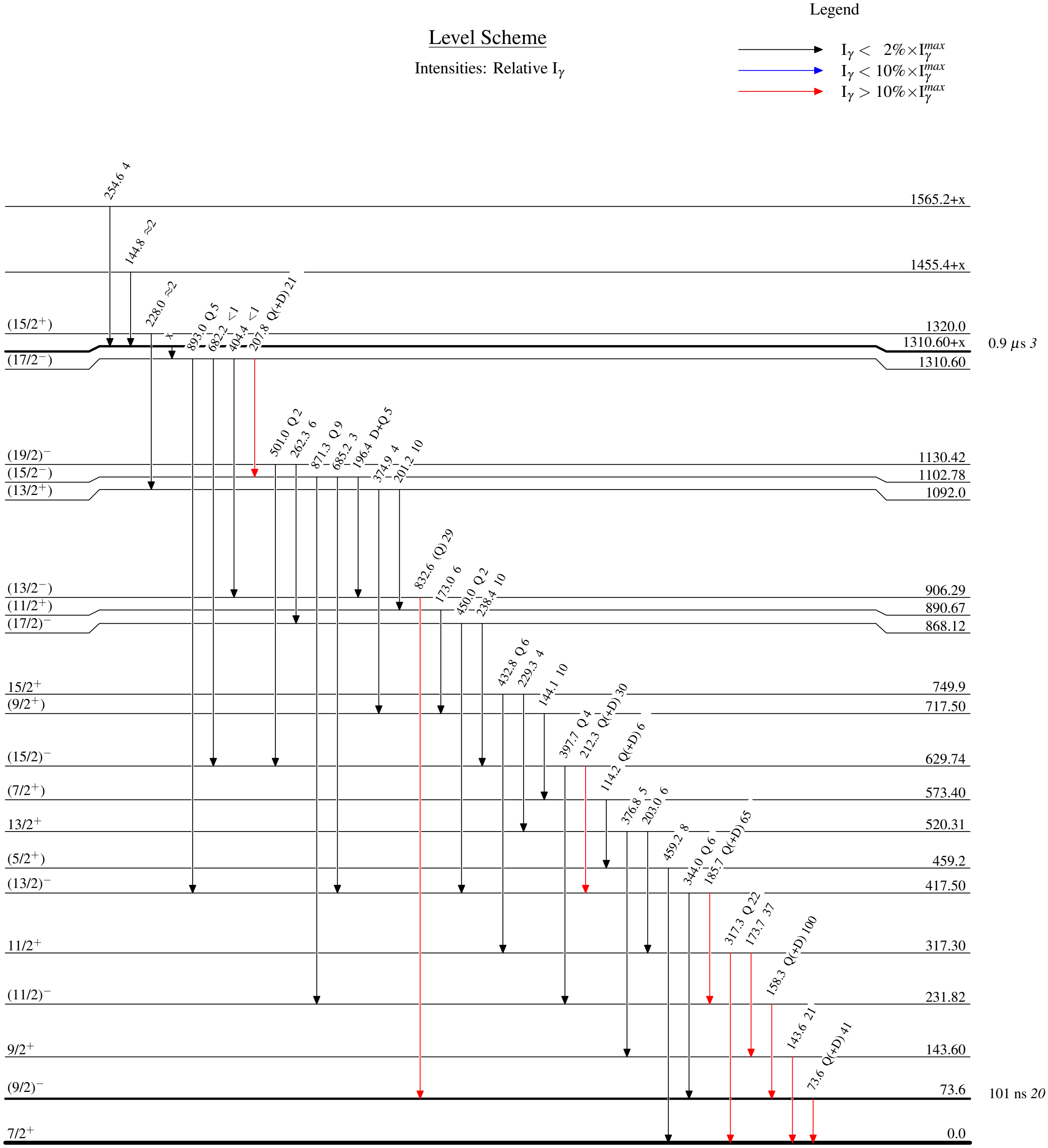
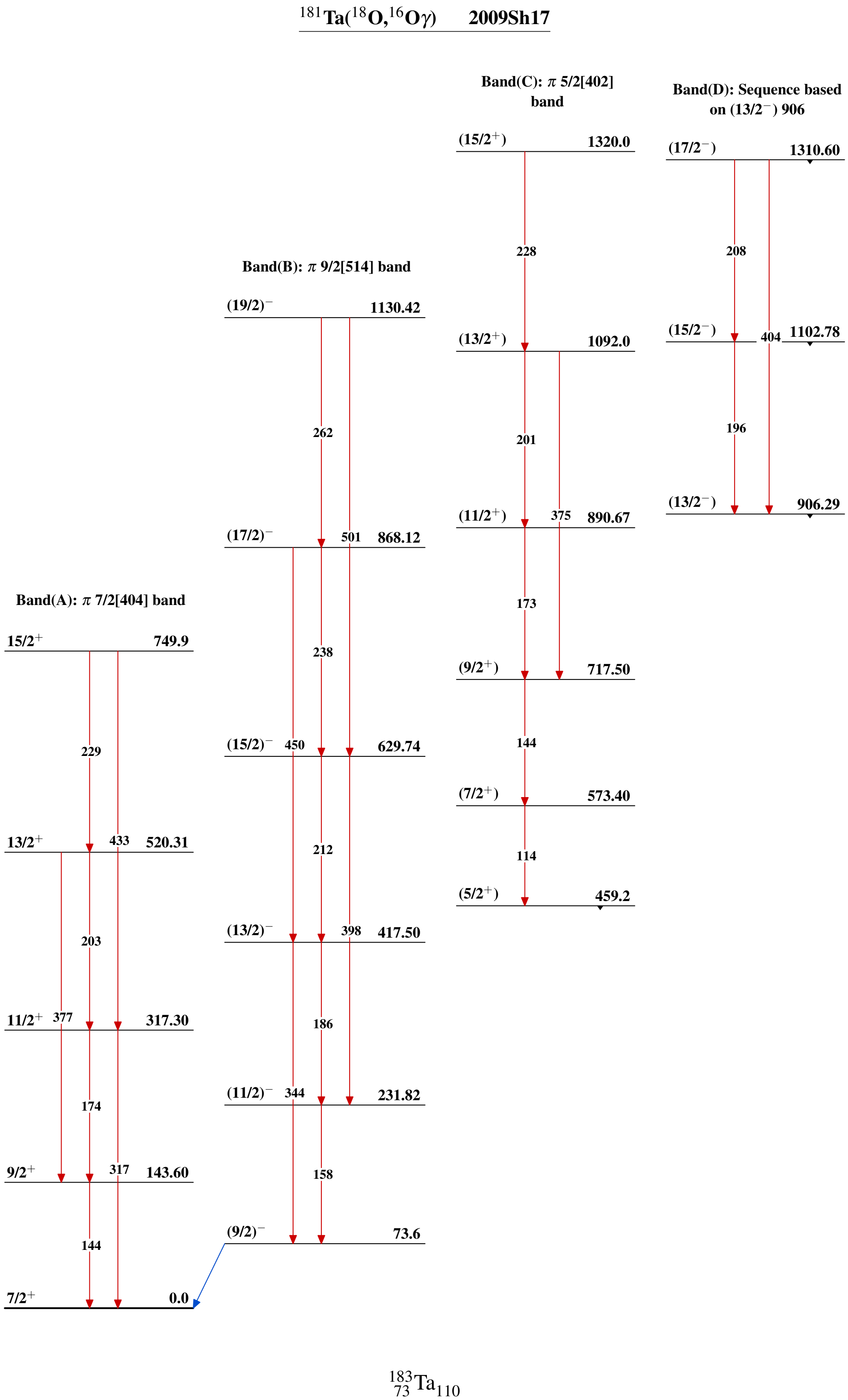
Level Scheme

Intensities: Relative I_γ



$^{183}_{73}Ta_{110}$



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Band(A): π 7/2[404] band
Band(B): π 9/2[514] band
Band(C): π 5/2[402] band
Band(D): Sequence based on (13/2⁻) 906
15/2+ 749.9
13/2+ 520.31
11/2+ 317.30
9/2+ 143.60
7/2+ 0.0
229
433
203
377
174
317
144
(19/2)− 1130.42
(17/2)− 868.12
(15/2)− 629.74
(13/2)− 417.50
(11/2)− 231.82
(9/2)− 73.6
262
501
238
450
212
398
186
344
158
(15/2+) 1320.0
(13/2+) 1092.0
(11/2+) 890.67
(9/2+) 717.50
(7/2+) 573.40
(5/2+) 459.2
228
201
375
173
144
114
(17/2−) 1310.60
(15/2−) 1102.78
(13/2−) 906.29
208
404
196
$^{183}_{73}Ta_{110}$