Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,1807 (2010)	15-Jun-2010

$Q(\beta^-)=-3.50\times10^3$ *3*; $S(n)=8.11\times10^3$ *4*; $S(p)=2.22\times10^3$ *4*; $Q(\alpha)=3.82\times10^3$ *4* 2012Wa38
Note: Current evaluation has used the following Q record −3500 308110 40 *2220* 40 *3820* 40 2003Au03,2009AuZZ.

^{168}Ta Levels

Cross Reference (XREF) Flags

A ^{168}W ε decay
B ^{142}Nd(^{30}Si,p3nγ)
C ^{145}Nd(^{27}Al,4nγ)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
0.0	(2⁻,3⁺)	2.0 min *1*	A	%ε+%β⁺=100 $T_{1/2}$(^{168}Ta^{73+})=5.2 min *7* (2002At01, preliminary value for fully-stripped ion). Jπ: low log *ft* to J=2 in ^{168}Hf (with proportionately large ε feedings) suggests J=2 or 3; comparison with neighboring isotopes and N=95 isotones. Jπ=2⁻ and 3⁺ could result from (π 1/2[541] − ν 5/2[642]) and (π 1/2[541] + ν 5/2[523]), respectively. $T_{1/2}$: from γ(t) for 124γ, 261γ and 751γ in 1989Hi04. Other values: 2.5 min *12* (1969Ar22), 2.44 min *35* (1976Le14).
178.43 *24*	1⁺		A	Jπ: log *ft*<5.9 from 0⁺ in ε decay.
352.27 *25*	(1⁺)		A	Jπ: highly uncertain; log *ft*<5.9 from 0⁺ ^{168}W for α decay scheme in which many transitions remain unplaced.
0.0+x			C	
77.4+x *15*			C	
198.7+x[#] *10*	(10⁻)		BC	
302.2+x[#] *13*	(11⁻)		BC	
465.7+x[#] *13*	(12⁻)		BC	
643.3+x[#] *13*	(13⁻)		BC	
879.7+x[#] *13*	(14⁻)		BC	
1116.3+x[#] *14*	(15⁻)		BC	
1403.5+x[#] *14*	(16⁻)		BC	
1689.8+x[#] *14*	(17⁻)		BC	
2009.5+x[#] *14*	(18⁻)		BC	
2334.1+x[#] *15*	(19⁻)		BC	
2665.5+x[#] *15*	(20⁻)		BC	
3006.9+x[#] *15*	(21⁻)		BC	
3317.8+x[#] *16*	(22⁻)		BC	
3653.2+x[#] *17*	(23⁻)		BC	
3959.5+x[#] *17*	(24⁻)		BC	
4325.1+x[#] *18*	(25⁻)		C	
4664.0+x[#] *19*	(26⁻)		C	
0.0+y[@]	(7⁺)		C	
77.3+y[@] *8*	(8⁺)		C	
184.9+y[@] *8*	(9⁺)		BC	
333.1+y[@] *10*	(10⁺)		BC	

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Adopted Levels, Gammas (continued)

^{168}Ta Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
502.3+y@ 11	(11+)	BC	2027.8+y@ 15	(17+)	BC	3806.7+y@ 19	(23+)	C
717.6+y@ 12	(12+)	BC	2355.8+y@ 16	(18+)	BC	4125.1+y@ 20	(24+)	C
928.9+y@ 13	(13+)	BC	2645.3+y@ 17	(19+)	BC	4457.9+y@ 20	(25+)	C
1197.2+y@ 13	(14+)	BC	2951.7+y@ 17	(20+)	C	4813.0+y@ 21	(26+)	C
1445.3+y@ 14	(15+)	BC	3225.9+y@ 18	(21+)	C	5177.0+y@ 21	(27+)	C
1752.3+y@ 15	(16+)	BC	3509.1+y@ 18	(22+)	C			

† From least-squares fit to Eγ, assigning 1 keV uncertainty to Eγ data for which the authors did not state an uncertainty.

‡ Values given without further comment are from ^{145}Nd(^{27}Al,4nγ) and are based on deduced band structure and likely configurations.

Band(A): π=(−) band. Strongly coupled band; probable configuration: (π $1h_{11/2}$)⊗(ν $1i_{13/2}$) based on low-lying quasiproton and quasineutron orbitals in neighboring odd-A nuclides and supported by experimental in-band B(M1)/B(E2) ratios and analogy with ^{170}Ta.(2008QiZZ).

@ Band(B): π=(+) band. Strongly coupled band; probable configuration: (π $2d_{5/2}$)⊗(ν $1i_{13/2}$). Assignment supported by experimental in-band B(M1)/B(E2) ratios and analogy with ^{170}Ta (2008QiZZ).

γ(^{168}Ta)

E_i(level)	J^π_i	Eγ†	Iγ†	E_f	J^π_f	Mult.	α@	Comments
178.43	1+	178.5‡ 3	100‡	0.0	(2−,3+)	[E1,E2]	0.26 18	
352.27	(1+)	173.9‡ 3	78‡ 11	178.43	1+	[M1,E2]	0.69 22	
		352.2‡ 3	100‡ 11	0.0	(2−,3+)	[E1,E2]	0.033 18	
198.7+x	(10−)	121.3#		77.4+x				Eγ=121.2 10 in ^{142}Nd(^{30}Si,p3nγ), but order of 121γ and 104γ is reversed in that study.
		198.7#		0.0+x				
302.2+x	(11−)	103.5 10	100	198.7+x	(10−)			Placement: see comment on 121.3γ.
465.7+x	(12−)	163.6 5		302.2+x	(11−)			
		267.0#		198.7+x	(10−)			Other Eγ: 284.8 10 from (^{30}Si,p3nγ); member of poorly resolved multiplet there. Possibly a 268γ placed in a separate band in that study is also a multiplet.
643.3+x	(13−)	177.5 5	100	465.7+x	(12−)			
		341.1 5	41 9	302.2+x	(11−)			Other Iγ: 50, also from (^{30}Si,p3nγ).
879.7+x	(14−)	236.4 10	<243	643.3+x	(13−)			
		414.0 5	100	465.7+x	(12−)			
1116.3+x	(15−)	236.6 10	<239	879.7+x	(14−)			
		473.0 5	100	643.3+x	(13−)			
1403.5+x	(16−)	287.2 10	<182	1116.3+x	(15−)			
		523.9 5	100	879.7+x	(14−)			
1689.8+x	(17−)	286.4 10	<173	1403.5+x	(16−)			
		573.4 5	100	1116.3+x	(15−)			
2009.5+x	(18−)	319.7 5	70 11	1689.8+x	(17−)			Other Iγ: 63, also from (^{30}Si,p3nγ).
		606.0 5	100	1403.5+x	(16−)			
2334.1+x	(19−)	324.6 5	50 3	2009.5+x	(18−)			Other Iγ: 63, also from (^{30}Si,p3nγ).
		644.3 10	100	1689.8+x	(17−)			
2665.5+x	(20−)	331.5 10	71 12	2334.1+x	(19−)			Other Iγ: 70, also from (^{30}Si,p3nγ).
		656.0 5	100	2009.5+x	(18−)			

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Adopted Levels, Gammas (continued)

$\gamma(^{168}Ta)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π
3006.9+x	(21⁻)	341.4 *10*	51	2665.5+x	(20⁻)
		672.8 *5*	100	2334.1+x	(19⁻)
3317.8+x	(22⁻)	310.9 *10*	100	3006.9+x	(21⁻)
		652.4 *10*	96	2665.5+x	(20⁻)
3653.2+x	(23⁻)	335.5 *10*	97	3317.8+x	(22⁻)
		646.2 *10*	100	3006.9+x	(21⁻)
3959.5+x	(24⁻)	306.2 *10*		3653.2+x	(23⁻)
		641.6 *10*		3317.8+x	(22⁻)
4325.1+x	(25⁻)	365.5#		3959.5+x	(24⁻)
		672.0#		3653.2+x	(23⁻)
4664.0+x	(26⁻)	339.0#		4325.1+x	(25⁻)
		704.5#		3959.5+x	(24⁻)
77.3+y	(8⁺)	77.1#		0.0+y	(7⁺)
184.9+y	(9⁺)	107.5#		77.3+y	(8⁺)
		185.1#		0.0+y	(7⁺)
333.1+y	(10⁺)	151.2 *10*		184.9+y	(9⁺)
		258.7#		77.3+y	(8⁺)
502.3+y	(11⁺)	166.2 *10*		333.1+y	(10⁺)
		317.4 *10*		184.9+y	(9⁺)
717.6+y	(12⁺)	215.4 *10*		502.3+y	(11⁺)
		381.5 *10*		333.1+y	(10⁺)
928.9+y	(13⁺)	211.3 *10*		717.6+y	(12⁺)
		426.6 *10*		502.3+y	(11⁺)
1197.2+y	(14⁺)	268.3 *10*		928.9+y	(13⁺)
		479.6 *10*		717.6+y	(12⁺)
1445.3+y	(15⁺)	248.1 *10*		1197.2+y	(14⁺)
1445.3+y	(15⁺)	516.4 *10*		928.9+y	(13⁺)
1752.3+y	(16⁺)	307.0 *10*		1445.3+y	(15⁺)
		555.2 *10*		1197.2+y	(14⁺)
2027.8+y	(17⁺)	275.3 *10*		1752.3+y	(16⁺)
		582.3 *10*		1445.3+y	(15⁺)
2355.8+y	(18⁺)	327.7 *10*		2027.8+y	(17⁺)
		604.0 *10*		1752.3+y	(16⁺)
2645.3+y	(19⁺)	289.4 *10*		2355.8+y	(18⁺)
		617.2 *10*		2027.8+y	(17⁺)
2951.7+y	(20⁺)	306.0#		2645.3+y	(19⁺)
		596.2#		2355.8+y	(18⁺)
3225.9+y	(21⁺)	274.1#		2951.7+y	(20⁺)
		580.8#		2645.3+y	(19⁺)
3509.1+y	(22⁺)	283.0#		3225.9+y	(21⁺)
		557.3#		2951.7+y	(20⁺)
3806.7+y	(23⁺)	297.9#		3509.1+y	(22⁺)
		581.0#		3225.9+y	(21⁺)
4125.1+y	(24⁺)	318.7#		3806.7+y	(23⁺)
		615.5#		3509.1+y	(22⁺)
4457.9+y	(25⁺)	332.5#		4125.1+y	(24⁺)
		651.5#		3806.7+y	(23⁺)
4813.0+y	(26⁺)	355#		4457.9+y	(25⁺)
		688.0#		4125.1+y	(24⁺)
5177.0+y	(27⁺)	364#		4813.0+y	(26⁺)
		719#		4457.9+y	(25⁺)

† From $^{142}Nd(^{30}Si,p3n\gamma)$, except where noted. Note that $E\gamma$ data from this reaction are typically a little higher than those from $^{145}Nd(^{27}Al,4n\gamma)$, leading to level energies from the two reactions that can differ by 4 or 5 keV in the worst cases.

‡ From ^{168}W ε decay.

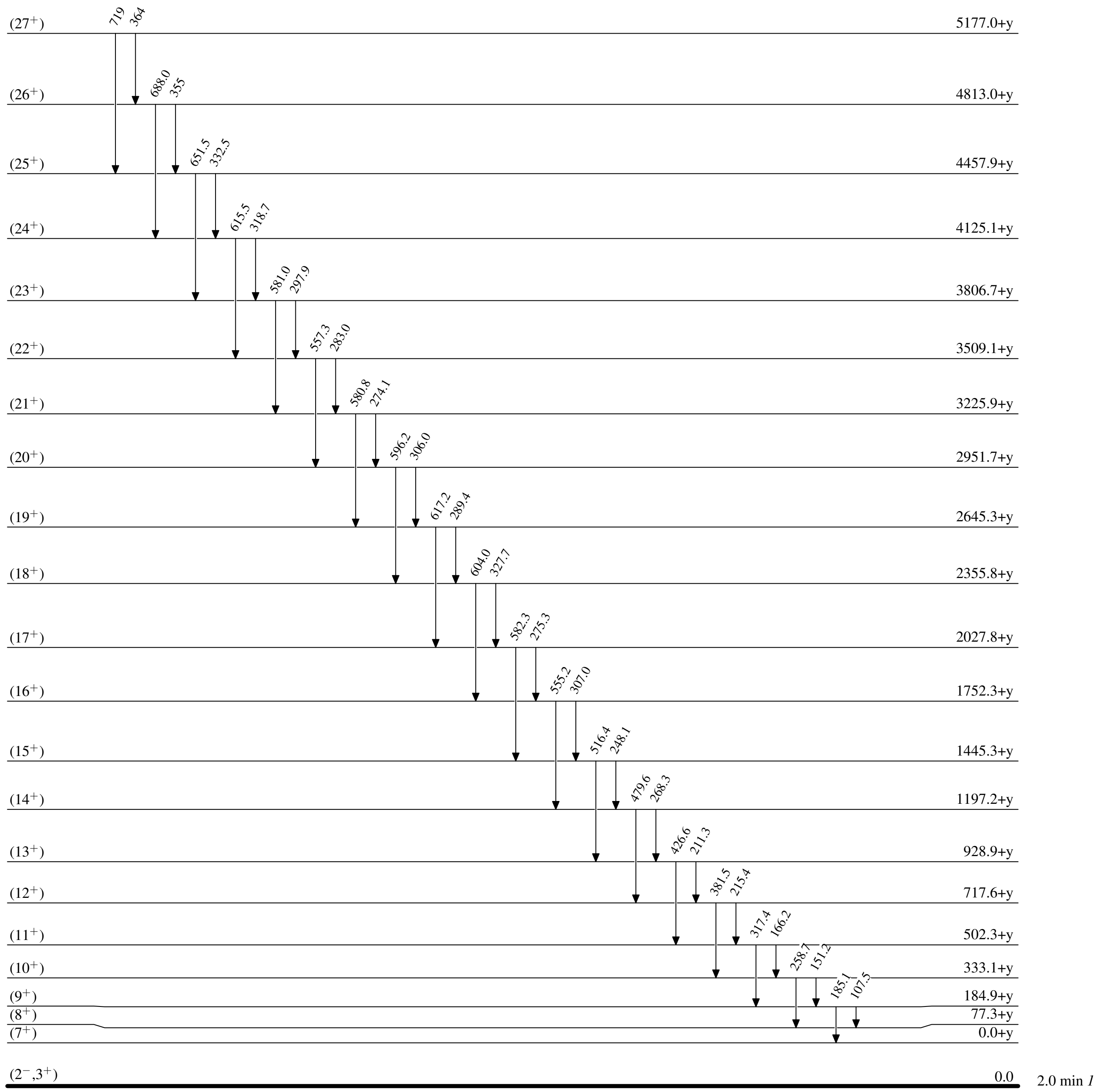
From $^{145}Nd(^{27}Al,4n\gamma)$; uncertainty unstated by authors..

@ 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.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

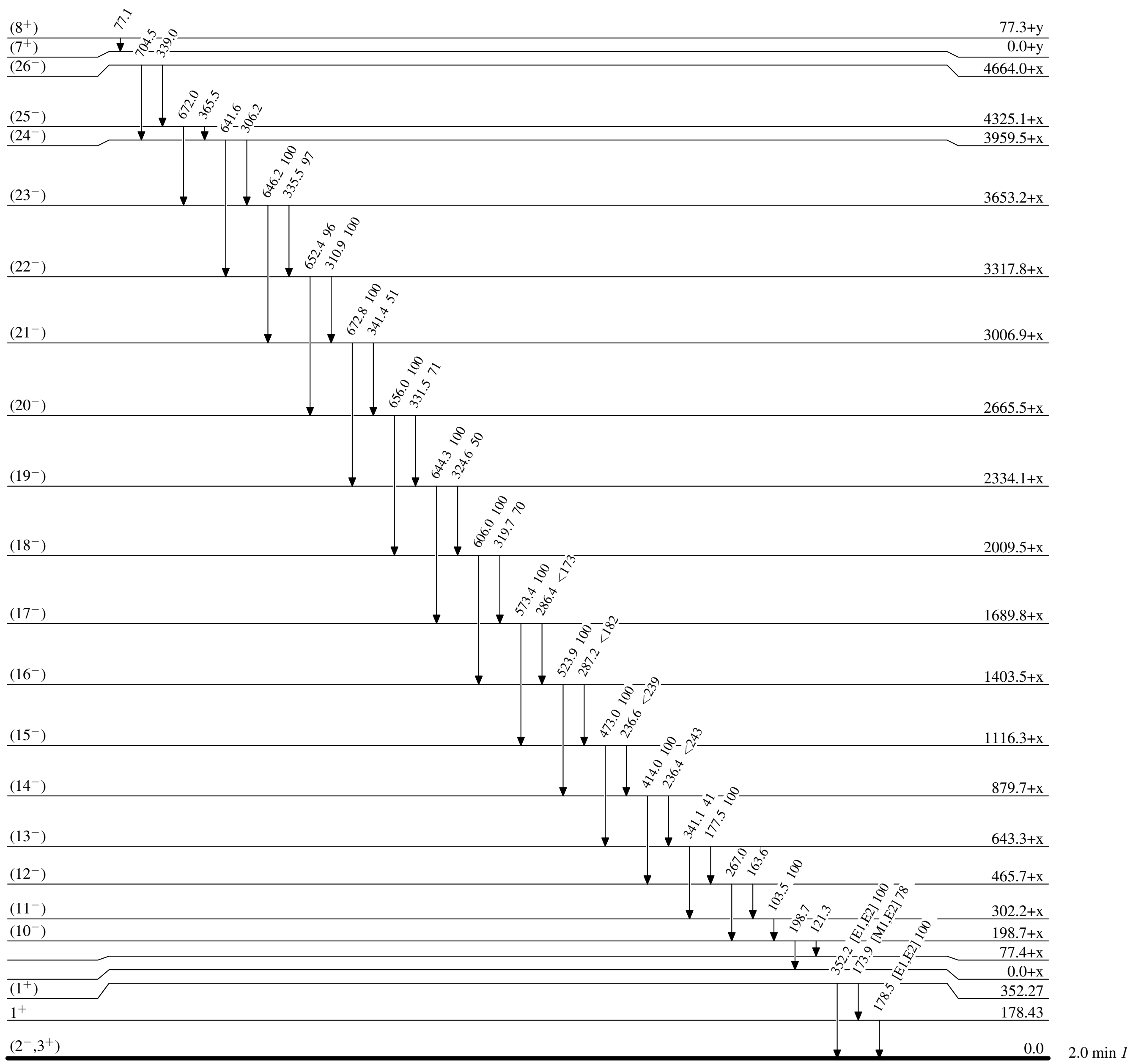


$^{168}_{73}Ta_{95}$

Adopted Levels, Gammas

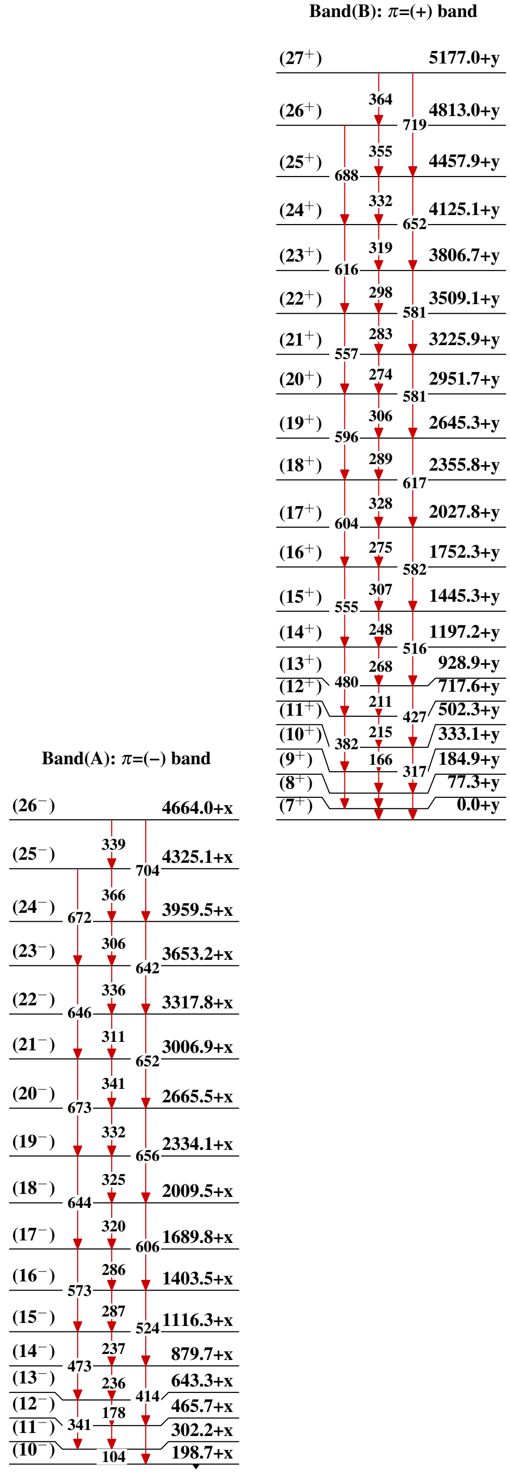
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{168}_{73}Ta_{95}$

Adopted Levels, Gammas



$^{168}_{73}Ta_{95}$