Coulomb excitation **2001Ol03,1976In07**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. -c. Wu	NDS 106, 367 (2005)	31-Aug-2005

2001Ol03: E(^{58}Ni)=225 MeV; PIN-diodes, NORDBALL spectrometer with 20 Ge detectors; measured Eγ,Iγ, (particle)γ-, γγ-coin.
1976In07: E(^{84}Kr)=348 MeV; Natural target; Ge(Li) detectors; measured σ(E;Eγ,θ), Eγ, Iγ, DSA for $T_{1/2}$. See also 1975In02.
1966As02: ^{181}Ta(p,p′γ),(α,α′γ); measured Eγ, γγ-, Xγ-coin, pγγ(θ), ce.
Other references: 2003Gu11, E(^{64}Ni)=70 MeV; 1967Se09, E(^{84}Kr)=348 MeV; 1960Bl10, E(p)=2.5 MeV; and 1970Ar02, E(α)=3.8 MeV.

^{181}Ta Levels

E(level)†	Jπ#	$T_{1/2}$‡	Comments
0.0@	7/2+	stable	
136.8@ 3	9/2+	42.0 ps 25	B(E2)↑=2.1 2 $T_{1/2}$: weighted average of 41.6 ps 35 (1960Bl10) and 42.6 ps 38 (1970Ar02). B(E2)↑: Weighted average of 2.8 8 (1956Hu49), 1.6 3 (1957Wo32), 2.23 17 (1958Mc02), and 2.0 3 (1962Ri09). Other values: 1.63 (1956Da40) and 1.97 (1960Be16).
302.4@ 3	11/2+	16 ps 3	B(E2)↑=0.53 4 B(E2)↑: Weighted average of 0.545 44 (1958Mc02) and 0.47 9 (1957Wo32). Other values: ≈0.72 (1956Hu49), 0.50 (1956Da40), 0.47 (1956Da40), 0.47 (1957Wo32), 0.46 (1960Be16), and 0.57 (1960Be16).
483.3& 5	5/2+		
495.8@ 4	13/2+	6.3 ps 8	
591.1& 4	7/2+		
717.5@ 5	15/2+	3.0 ps 4	
728.7& 5	9/2+		
894.5& 5	11/2+		
965.7@ 5	17/2+	1.93 ps 24	
1087.5& 6	13/2+		
1206.5a 4	(3/2+)		
1240.3@ 6	19/2+	1.12 ps 14	
1278.6a 4	(5/2+)		
1306.8& 6	15/2+		
1380.7a 4	(7/2+)		
1381.1b 4	(11/2+)		
1508.6a 5	(9/2+)		
1540.0@ 6	21/2+	0.76 ps 10	
1550.1& 7	17/2+		
1564.1b 5	(13/2+)		
1665.6a 5	(11/2+)		
1772.6b 5	(15/2+)		
1817.9& 7	(19/2+)		
1863.7@ 7	23/2+		
2001.8b 7	(17/2+)		
2210.8@ 7	25/2+		
2580.7@ 8	27/2+		
2968.8@ 9	29/2+		

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Coulomb excitation 2001Ol03,1976In07 (continued)

^{181}Ta Levels (continued)

† From least-square fit to Eγ's, assuming Δ(Eγ)=0.5 keV.
‡ Determined from Doppler-broadened γ-ray line-shape fits (1976In07) with the exception of the 136-keV level.
# From band structure and γγ-coin. information (2001Ol03).
@ 7/2[404] ground state band.
& 5/2[402] band.
a Gamma vibration band K=3/2.
b Gamma vibration band K=11/2.

γ(^{181}Ta)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ#	α&	Comments
108@		591.1	7/2+	483.3	5/2+				
136.5		136.8	9/2+	0.0	7/2+	M1+E2	+0.394 *11*	1.75 *1*	α(K)=1.39 *1*; α(L)=0.278 *2*; α(M)=0.0645 *5*; α(N+..)=0.0192 *1* δ: sign: from γ(θ) (1966As02); value: weighted average of: +0.360 *15* from α_K(exp)=1.41 *4* and angular correlation (1966As02); 0.45 *4* from angular distribution (1956De44); 0.435 *22* from ICC (1960Be16), 0.45 *4* from T1/2 and B(E2) (1960Bl10) and 0.35 *8* from angular distribution (1976In07). A_2=−0.028 *11*, A_4=0.007 *17* (1976In07).
137@		728.7	9/2+	591.1	7/2+				
165.6	100	302.4	11/2+	136.8	9/2+	M1+E2	+0.363 *10*	1.01	α(K)=0.817 *4*; α(L)=0.149 *1*; α(M)=0.0342 *1*; α(N+..)=0.0102 δ: sign: from γ(θ) (1966As02); value: weighted average of values: +0.357 *13* from α_K(exp)=0.80 *4* and angular correlation (1966As02); 0.37 *5* from angular distribution (1958Ma36, 1959De29); 0.37 *15* from ICC (1960Be16) and 0.53 *+47−20* from angular distribution (1976In07). A_2=0.026 *12*, A_4=0.025 *19* (1976In07).
166@		894.5	11/2+	728.7	9/2+				
193@		1087.5	13/2+	894.5	11/2+				
193.8	100	495.8	13/2+	302.4	11/2+	M1+E2	0.53 *+12−9*	0.61 *3*	α(K)= 0.49 *3*; α(L)= 0.0946 *19*; α(M)= 0.0219 *6*; α(N+..)=0.00644 *16* A_2=0.082 *16*, A_4=0.002 *24* (1976In07).
219@		1306.8	15/2+	1087.5	13/2+				
221.5	100	717.5	15/2+	495.8	13/2+	M1+E2	0.49 *+7−12*	0.424 *19*	α(K)= 0.343 *20*; α(L)= 0.0623 *3*; α(M)=0.01432 *16*; α(N+..)=0.00420 *4* A_2=0.13 *3*, A_4=0.02 *5* (1976In07).
243@		1550.1	17/2+	1306.8	15/2+				
248.4	100	965.7	17/2+	717.5	15/2+	M1+E2	0.33 *+14−10*	0.327 *17*	α(K)= 0.269 *17*; α(L)= 0.0446 *3*; α(M)=0.01013; α(N+..)=0.00297 A_2=0.10 *7*, A_4=0.02 *11* (1976In07).
268@		1817.9	(19/2+)	1550.1	17/2+				

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Coulomb excitation 2001Ol03,1976In07 (continued)

$\gamma(^{181}Ta)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[&]	Comments
274.6	100	1240.3	$19/2^+$	965.7	$17/2^+$	[M1+E2]	0.3	0.251 *3*	α(K)= 0.2071 *21*; α(L)= 0.0336 *4*; α(M)=0.00762 *8*; α(N+..)=0.00223 δ: assumed on the basis of lower level systematics.
300[@]		1540.0	$21/2^+$	1240.3	$19/2^+$				
301.6	68 *5*	302.4	$11/2^+$	0.0	$7/2^+$	E2		0.0814	α(K)= 0.0555; α(L)=0.01977; α(M)=0.00477; α(N+..)=0.00137 A_2=0.020 *13*, A_4=0.023 *20* (1976In07).
303[@]		894.5	$11/2^+$	591.1	$7/2^+$				
324[@]		1863.7	$23/2^+$	1540.0	$21/2^+$				
347[@]		2210.8	$25/2^+$	1863.7	$23/2^+$				
359.0	153 *12*	495.8	$13/2^+$	136.8	$9/2^+$	E2		0.0490	α(K)= 0.0352; α(L)=0.01056; α(M)=0.00253; α(N+..)=0.00073 A_2=0.063 *15*, A_4=0.040 *22* (1976In07).
359[@]		1087.5	$13/2^+$	728.7	$9/2^+$				
412[@]		1306.8	$15/2^+$	894.5	$11/2^+$				
415.2	231 *20*	717.5	$15/2^+$	302.4	$11/2^+$	E2		0.0328	α(K)=0.02439; α(L)=0.00645; α(M)=0.00154; α(N+..)=0.00044 A_2=0.153 *21*, A_4=0.01 *3* (1976In07).
463[@]		1550.1	$17/2^+$	1087.5	$13/2^+$				
469.9	322 *41*	965.7	$17/2^+$	495.8	$13/2^+$	E2		0.02372	α(K)=0.01805; α(L)=0.00434; α(M)=0.00103; α(N+..)=0.00030 A_2=0.16 *4*, A_4=0.04 *6* (1976In07).
511[@]		1817.9	$(19/2^+)$	1306.8	$15/2^+$				
522.7	4.9×10^2 *16*	1240.3	$19/2^+$	717.5	$15/2^+$	E2		0.01821	α(K)=0.01403; α(L)=0.00314 A_2=0.19 *6*, A_4=0.01 *10* (1976In07).
574.3		1540.0	$21/2^+$	965.7	$17/2^+$	E2		0.01449	α(K)=0.01131; α(L)=0.00239
616[@]		1206.5	$(3/2^+)$	591.1	$7/2^+$				
623[@]		1863.7	$23/2^+$	1240.3	$19/2^+$				
651[@]		1380.7	$(7/2^+)$	728.7	$9/2^+$				
671[@]		2210.8	$25/2^+$	1540.0	$21/2^+$				
688[@]		1278.6	$(5/2^+)$	591.1	$7/2^+$				
717[@]		2580.7	$27/2^+$	1863.7	$23/2^+$				
723[@]		1206.5	$(3/2^+)$	483.3	$5/2^+$				
758[@]		2968.8	$29/2^+$	2210.8	$25/2^+$				
1078[@]		1380.7	$(7/2^+)$	302.4	$11/2^+$				
1078[@]		1381.1	$(11/2^+)$	302.4	$11/2^+$				
1142[@]		1278.6	$(5/2^+)$	136.8	$9/2^+$				
1169[@]		1665.6	$(11/2^+)$	495.8	$13/2^+$				
1206[@]		1206.5	$(3/2^+)$	0.0	$7/2^+$				
1206[@]		1508.6	$(9/2^+)$	302.4	$11/2^+$				
1244[@]		1380.7	$(7/2^+)$	136.8	$9/2^+$				
1244[@]		1381.1	$(11/2^+)$	136.8	$9/2^+$				
1262[@]		1564.1	$(13/2^+)$	302.4	$11/2^+$				
1278[@]		1278.6	$(5/2^+)$	0.0	$7/2^+$				
1278[@]		1772.6	$(15/2^+)$	495.8	$13/2^+$				
1364[@]		1665.6	$(11/2^+)$	302.4	$11/2^+$				
1372[@]		1508.6	$(9/2^+)$	136.8	$9/2^+$				E_γ: 1382 from 2001Ol03 was

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Coulomb excitation 2001Ol03,1976In07 (continued)

$\gamma(^{181}Ta)$ (continued)

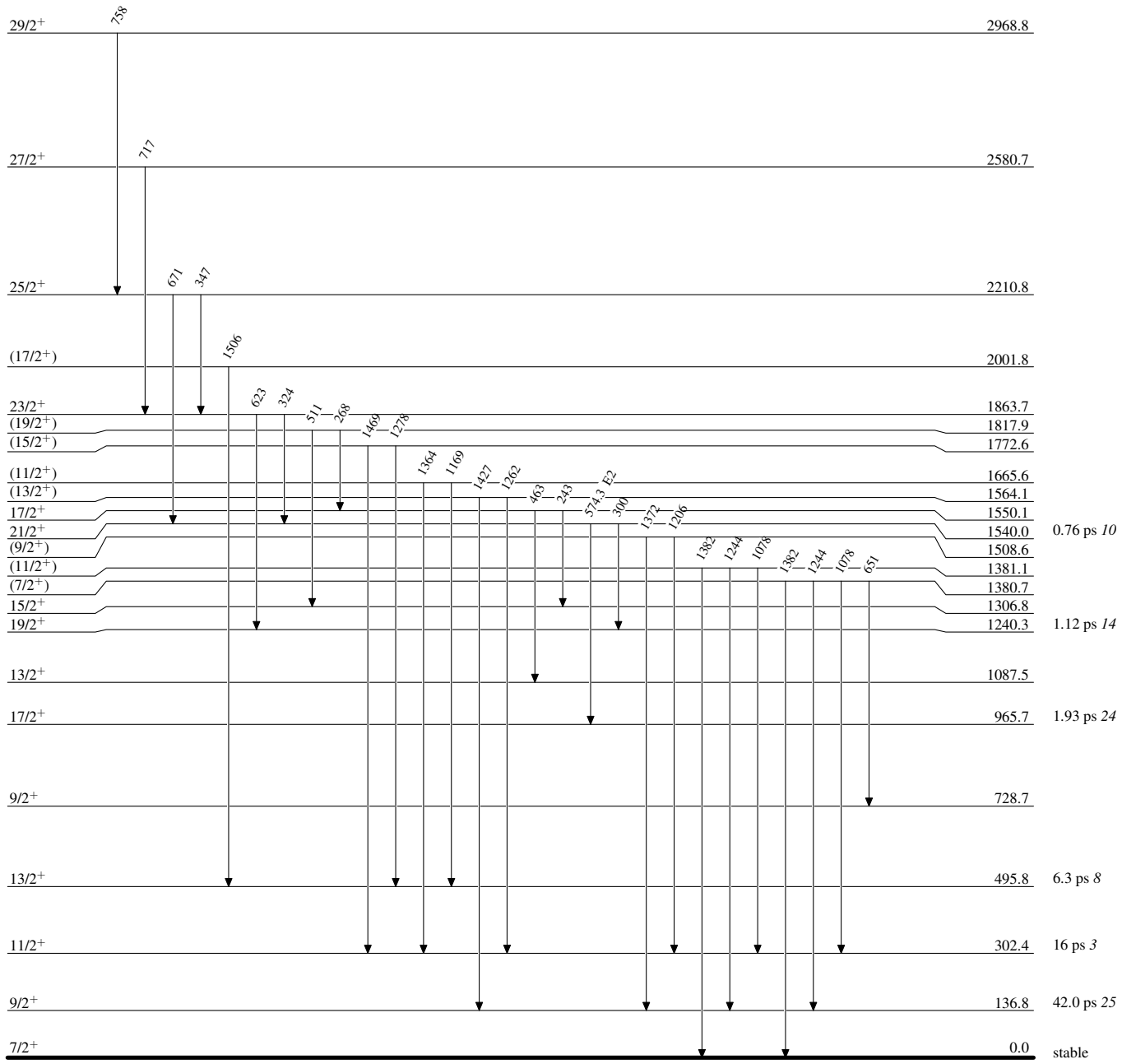
E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
					inconsistent with the level energy difference, typographic error assumed.
1382[@]	1380.7	$(7/2^+)$	0.0	$7/2^+$	
1382[@]	1381.1	$(11/2^+)$	0.0	$7/2^+$	
1427[@]	1564.1	$(13/2^+)$	136.8	$9/2^+$	
1469[@]	1772.6	$(15/2^+)$	302.4	$11/2^+$	
1506[@]	2001.8	$(17/2^+)$	495.8	$13/2^+$	

[†] From 1976In02, except as noted, energy uncertainties not given.
[‡] Branching intensities are taken from 1976In07.
[#] From angular distribution coefficients (1976In07), except as noted.
[@] From 2001Ol03.
[&] 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.

Coulomb excitation 2001Ol03,1976In07

Level Scheme

Intensities: Relative $I_{(\gamma+ce)}$

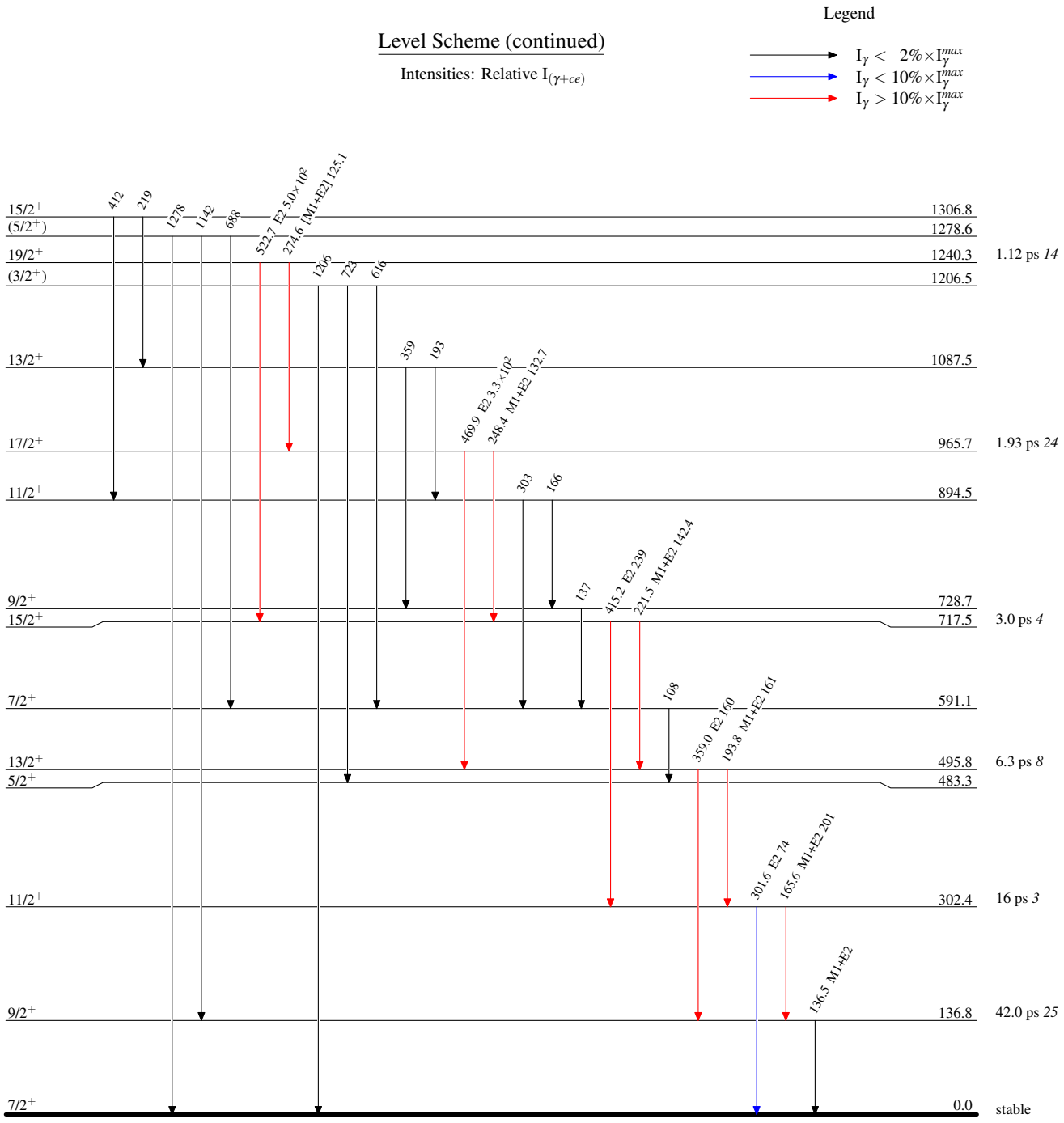


$^{181}_{73}Ta_{108}$

Coulomb excitation 2001Ol03,1976In07

Level Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$



$^{181}_{73}Ta_{108}$