^{130}Te(^{11}B,4nγ) 2006Ch38

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 108,2173 (2007)	1-Oct-2006

Additional information 1.

E=52 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO), using eight Compton-suppressed 'Clover' Ge detectors at 120°, 90 °, 60°, ±30°, −70°, −105°, and −145° with respect to the beam direction. Shell-model calculations for two cascades of E1 transitions.

Other measurement: 2006Li24. Used the same reaction and about the same projectile energy (E=50 MeV). Most γ rays reported in 2006Ch38 were seen also in 2006Li24. However, evaluators believe that the better efficiency of clover detectors used in 2006Ch38 made possible the detection of coincidences with higher-energy γ rays, thus producing a more reliable level scheme. Others: 1973Na08, 1973Le09.

^{137}La Levels

E(level)[†]	J$^\pi$	T$_{1/2}$
0.0[#]	7/2$^+$	
10.40 *13*	5/2$^+$	
762.40[#] *9*	11/2$^+$	
835.60 *9*	9/2$^+$	
1005.10 *11*	11/2$^-$	
1723.31[c] *14*	13/2$^+$	
1729.01 *14*	13/2$^-$	
1787.21 *14*	15/2$^-$	
1792.01[#] *18*	15/2$^+$	
1864.21[c] *17*	17/2$^+$	
1869.91[@] *16*	19/2$^-$	342[‡] ns *25*
1882.01[b] *16*	19/2$^-$	
2010.31[c] *19*	21/2$^+$	
2337.81[b] *17*	21/2$^+$	
2340.41[@] *16*	21/2$^-$	
2649.8[#] *3*	19/2$^+$	
2832.61[a] *18*	21/2$^+$	
2882.91[c] *22*	25/2$^+$	
2920.71[a] *16*	23/2$^-$	
3041.51[@] *17*	23/2$^-$	
3099.71[b] *17*	25/2$^+$	
3201.51[a] *18*	25/2$^+$	
3252.31[c] *19*	27/2$^-$	
3430.01[a] *18*	27/2$^-$	
3517.5[#] *3*	23/2$^+$	
3543.51[c] *22*	29/2$^+$	
3547.71 *18*	25/2$^-$	
3590.11[@] *17*	25/2$^-$	
3846.51[c] *24*	31/2$^-$	
3934.71[b] *19*	29/2$^+$	
3964.11[@] *18*	27/2$^-$	
4030.9 *3*	(27/2,29/2)	
4105.7 *3*	(27/2,29/2)	
4108.51 *22*	25/2$^-$	
4347.11[&] *18*	27/2$^-$	
4486.2[@] *3*	29/2$^-$	
4548.81[b] *19*	31/2$^-$	
4584.2 *3*	33/2$^-$	
4610.31[&] *20*	29/2$^-$	
4897.11[&] *22*	31/2$^-$	
4897.12[b] *21*	33/2$^+$	
4918.5[c] *3*	33/2$^-$	
4940.61 *25*	(31/2$^-$)	
5121.2 *3*	(31/2$^-$)	
5255.0[&] *3*	33/2$^-$	
5471.12[b] *23*	35/2$^-$	
5541.6[@] *3*	(31/2,33/2)	
5771.6[&] *3*	(35/2$^-$)	
5882.7[c] *4*	(37/2$^-$)	
5985.7[&] *4*	(39/2$^-$)	

[†] Deduced by evaluators from a least squares fit to Eγ's.
[‡] From ^{136}Xe on ^{198}Pt (2004Va03).
[#] Band(A): g.s. Band.
[@] Band(B): γ sequence based on 19/2$^-$.
[&] Band(C): γ sequence based on 27/2$^-$.
[a] Band(D): Sequence of E1 transitions based on 21/2$^+$.
[b] Band(E): Sequence of E1 transitions based on 19/2$^-$.
[c] Band(F): γ sequence based on 13/2$^+$.

^{130}Te(^{11}B,4nγ) 2006Ch38 (continued)

γ(^{137}La)

DCO′s correspond to gates on ΔJ=2, quadrupole transitions, unless otherwise stated.

R=(Iγ_1 at 90°,gated by γ_2 at 60°)/(Iγ_1 at 30°, gated by γ_2 at 60°). Typical values are 1.2-1.8 for ΔJ=1, dipole transitions and 0.45-0.85 for ΔJ=2, quadrupole transitions.

IPDCO=Integrated Polarization Directional Correlation from Oriented nuclei. IPDCO=(α(Eγ)N$_{90°}$−N$_{180°}$)/(α(Eγ)N$_{90°}$+N$_{180°}$), where α(Eγ)=N$_{180°}$(unpolarized)/N$_{90°}$(unpolarized). Positive value of IPDCO suggests electric transition and negative value suggests magnetic transition.

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	Comments
58.2 *2*		1787.21	15/2$^-$	1729.01	13/2$^-$	M1[#]	
72.2 *2*	0.80 *16*	1864.21	17/2$^+$	1792.01	15/2$^+$	M1	
82.7 *1*	5.1 *5*	1869.91	19/2$^-$	1787.21	15/2$^-$	E2[#]	
88.1 *2*	4.4 *9*	2920.71	23/2$^-$	2832.61	21/2$^+$	E1	
94.8 *1*	9.2 *9*	1882.01	19/2$^-$	1787.21	15/2$^-$	E2	DCO=1.34 *9* R=0.82 *1*. IPDCO=+0.13 *4*.
98.0[‡] *2*	3.4 *7*	4584.2	33/2$^-$	4486.2	29/2$^-$	E2	DCO=1.9 *4* R=0.72 *3*.
140.9 *2*	1.8 *4*	1864.21	17/2$^+$	1723.31	13/2$^+$	E2	DCO=0.95 *12* R=0.77 *18*. IPDCO=+0.24 *10*.
146.1 *2*	3.1 *6*	2010.31	21/2$^+$	1864.21	17/2$^+$	E2	DCO=1.10 *10* R=0.45 *1*. IPDCO=+0.13 *7*.
152.6[‡] *1*	13.1 *13*	3252.31	27/2$^-$	3099.71	25/2$^+$	E1	DCO=0.98 *21*, 1.14 *9*. R=1.38 *21*. IPDCO=+0.086 *18*.
169.5 *1*	54 *5*	1005.10	11/2$^-$	835.60	9/2$^+$	E1	A$_4$=+0.131 *23*
179.0[‡] *1*	31 *3*	3099.71	25/2$^+$	2920.71	23/2$^-$	E1	DCO=1.27 *5*, 1.09 *6*. R=1.08 *2*. IPDCO=+0.13 *3*.
201.7[‡] *1*	5.9 *6*	4548.81	31/2$^-$	4347.11	27/2$^-$	E2	DCO=1.9 *5* R=0.74 *4*.
214.1 *2*	2.4 *5*	5985.7	(39/2$^-$)	5771.6	(35/2$^-$)	E2	R=0.50 *2*. IPDCO=+0.13 *5*.
216.8 *2*	1.8 *4*	3099.71	25/2$^+$	2882.91	25/2$^+$	E2	DCO=0.96 *13* R=0.49 *3*. IPDCO=+0.23 *8*.
228.5[‡] *1*	8.1 *8*	3430.01	27/2$^-$	3201.51	25/2$^+$	E1	DCO=0.95 *17* R=1.30 *2*. IPDCO=+0.105 *19*.
238.6 *2*	2.4 *5*	4347.11	27/2$^-$	4108.51	25/2$^-$	M1+E2	DCO=0.8 *3* R=1.09 *20*.
263.2 *1*	7.4 *7*	4610.31	29/2$^-$	4347.11	27/2$^-$	M1+E2	DCO=0.79 *24* R=1.25 *22*. DCO=1.4 *3* (dipole gated).
280.8[‡] *1*	15.3 *15*	3201.51	25/2$^+$	2920.71	23/2$^-$	E1	DCO=0.99 *14* R=1.23 *4*. IPDCO=+0.106 *23*.
286.8[‡] *1*	9.6 *10*	4897.11	31/2$^-$	4610.31	29/2$^-$	M1+E2	DCO=2.3 *9*, 1.01 *22*. R=1.28 *16*.
291.2 *1*	6.9 *7*	3543.51	29/2$^+$	3252.31	27/2$^-$	E1	R=1.33 *5*. IPDCO=+0.10 *5*.
303.0 *1*	6.6 *7*	3846.51	31/2$^-$	3543.51	29/2$^+$	E1	=1.32 *6*.
314.4 *2*	2.4 *5*	5255.0	33/2$^-$	4940.61	(31/2$^-$)	(M1+E2)	
330.3 *1*	24.4 *24*	3430.01	27/2$^-$	3099.71	25/2$^+$	E1	R=1.34 *14*. IPDCO=+0.071 *20*.
348.3[‡] *1*	12.5 *13*	4897.12	33/2$^+$	4548.81	31/2$^-$	E1	DCO=0.99 *9* R=1.15 *2*.
357.9 *2*	4.2 *8*	5255.0	33/2$^-$	4897.11	31/2$^-$	M1	R=1.18 *8*.
374.0[‡] *1*	10.0 *10*	3964.11	27/2$^-$	3590.11	25/2$^-$	M1	DCO=1.2 *3* R=1.36 *3*. IPDCO=−0.10 *4*.
391.8 *2*	3.1 *6*	4940.61	(31/2$^-$)	4548.81	31/2$^-$	(M1+E2)	
416.4 *1*	5.0 *5*	3964.11	27/2$^-$	3547.71	25/2$^-$	M1	DCO=0.63 *17* R=1.22 *16*.

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^{130}Te(^{11}B,4nγ) 2006Ch38 (continued)

γ(^{137}La) (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
455.8 *1*	22.1 *22*	2337.81	21/2+	1882.01	19/2−	E1	DCO=0.49 *8* R=1.46 *4*. IPDCO=+0.103 *25*. DCO=0.99 *9* (dipole gated).
470.5‡ *1*	33 *3*	2340.41	21/2−	1869.91	19/2−	M1	DCO=0.92 *12* R=1.46 *11*.
483.2 *2*	2.3 *5*	4030.9	(27/2,29/2)	3547.71	25/2−		
504.7‡ *1*	15.4 *15*	3934.71	29/2+	3430.01	27/2−	E1	DCO=1.11 *18* R=1.41 *2*.
506.2 *1*	8.3 *8*	3547.71	25/2−	3041.51	23/2−	M1+E2	DCO=0.88 *18*
516.6 *2*	3.8 *8*	5771.6	(35/2−)	5255.0	33/2−	(M1+E2)	R=1.8 *3*.
522.1 *2*	4.1 *8*	4486.2	29/2−	3964.11	27/2−	M1	DCO=0.45 *18* R=1.89 *11*. IPDCO=−0.18 *6*.
548.6 *1*	14.3 *14*	3590.11	25/2−	3041.51	23/2−	M1+E2	DCO=0.77 *15* DCO=0.75 *21* (dipole gated).
558.0 *2*	1.8 *6*	4105.7	(27/2,29/2)	3547.71	25/2−		
574.0 *1*	5.9 *6*	5471.12	35/2−	4897.12	33/2+	E1	R=1.78 *17*. IPDCO=+0.08 *4*.
580.3‡ *1*	10.6 *11*	2920.71	23/2−	2340.41	21/2−	M1+E2	DCO=1.6 *3*, 2.19 *23*.
582.9 *1*	19.1 *19*	2920.71	23/2−	2337.81	21/2+	E1	DCO=0.69 *4* R=1.22 *2*. IPDCO=+0.09 *3*. DCO=0.91 *7* (dipole gated).
614.1‡ *1*	13.3 *13*	4548.81	31/2−	3934.71	29/2+	E1	DCO=1.1 *3* R=1.55 *6*. IPDCO=+0.08 *4*.
701.1‡ *1*	7.8 *8*	3041.51	23/2−	2340.41	21/2−	M1	DCO=1.12 *7* R=1.35 *2*.
723.9‡ *1*	15.3 *15*	1729.01	13/2−	1005.10	11/2−	M1+E2#	DCO=0.76 *5*
757.0 *1*	10.0 *10*	4347.11	27/2−	3590.11	25/2−	M1	DCO=0.58 *22* R=1.43 *13*.
762.4 *1*	9.6 *10*	762.40	11/2+	0.0	7/2+	E2	DCO=1.18 *13* R=0.63 *3*. IPDCO=+0.19 *10*.
782.1 *1*	53 *5*	1787.21	15/2−	1005.10	11/2−	E2	DCO=1.05 *4* R=0.63 *1*. IPDCO=+0.07 *3*.
799.4 *2*	2.1 *4*	4347.11	27/2−	3547.71	25/2−	M1	R=1.25 *7*.
825.2 *1*	59 *6*	835.60	9/2+	10.40	5/2+	E2#	DCO=1.01 *4* R=0.61 *1*. IPDCO=+0.07 *3*.
835.6 *1*	23.9 *24*	835.60	9/2+	0.0	7/2+	M1#	DCO=0.69 *16*
857.8 *2*	1.10 *22*	2649.8	19/2+	1792.01	15/2+	E2	DCO=1.0 *4* R=0.35 *3*. IPDCO=+0.23 *10*.
867.7 *2*	0.30 *6*	3517.5	23/2+	2649.8	19/2+	E2	DCO=0.9 *3* R=0.40 *9*.
872.6 *2*	2.8 *6*	2882.91	25/2+	2010.31	21/2+	E2	DCO=1.16 *12* R=0.31 *2*.
887.7 *2*	3.2 *6*	1723.31	13/2+	835.60	9/2+	E2	DCO=1.1 *3* R=0.56 *3*. IPDCO=+0.21 *4*.
910.4 *2*	2.2 *4*	2920.71	23/2−	2010.31	21/2+	M2	DCO=1.1 *3* R=0.45 *10*.
917.1 *2*	2.1 *4*	4347.11	27/2−	3430.01	27/2−	M1	
950.6 *1*	16.9 *17*	2832.61	21/2+	1882.01	19/2−	E1	DCO=0.55 *15* R=1.15 *4*. IPDCO=+0.05 *3*.
960.9 *2*	2.6 *5*	1723.31	13/2+	762.40	11/2+	M1	
964.2 *2*	1.9 *4*	5882.7	(37/2−)	4918.5	33/2−	(E2)	R=0.40 *13*.
1005.1 *2*	2.0 *4*	1005.10	11/2−	0.0	7/2+	M2#	R=0.65 *8*.
1029.6 *2*	4.5 *9*	1792.01	15/2+	762.40	11/2+	E2	A_4=+0.18 *9*
1055.4 *2*	3.6 *7*	5541.6	(31/2,33/2)	4486.2	29/2−		
1067.0 *2*	2.2 *4*	4108.51	25/2−	3041.51	23/2−	M1+E2	DCO=0.77 *17*

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$^{130}Te(^{11}B,4n\gamma)$ 2006Ch38 (continued)

$\gamma(^{137}La)$ (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
1072.0 *2*	4.7 *9*	4918.5	33/2⁻	3846.51	31/2⁻	M1+E2	R=1.15 *10*.
1094.8 *2*	1.4 *3*	4347.11	27/2⁻	3252.31	27/2⁻	M1	R=1.2 *4*.
1118.8 *2*	4.1 *8*	4548.81	31/2⁻	3430.01	27/2⁻	E2	R=0.56 *5*.
1157.1 *2*	2.4 *5*	5121.2	(31/2⁻)	3964.11	27/2⁻	(E2)	R=0.51 *4*.
1171.6 *1*	18.9 *19*	3041.51	23/2⁻	1869.91	19/2⁻	E2	R=0.49 *3*.
1207.3‡ *2*	2.8 *6*	3547.71	25/2⁻	2340.41	21/2⁻	E2	DCO=1.7 *6* R=0.53 *4*.
1249.7 *1*	10.0 *10*	3590.11	25/2⁻	2340.41	21/2⁻	E2	R=0.54 *5*.

† Uncertainties have been assigned by evaluators based on general statements by 2006Ch38 that energy uncertainty is 0.1-0.2 keV and intensity uncertainty is 10% for strong transitions and 15-20% for others, as follows: 0.1 keV and 10% for $I\gamma \geq 5$, 0.2 keV and 20% for $I\gamma < 5$.

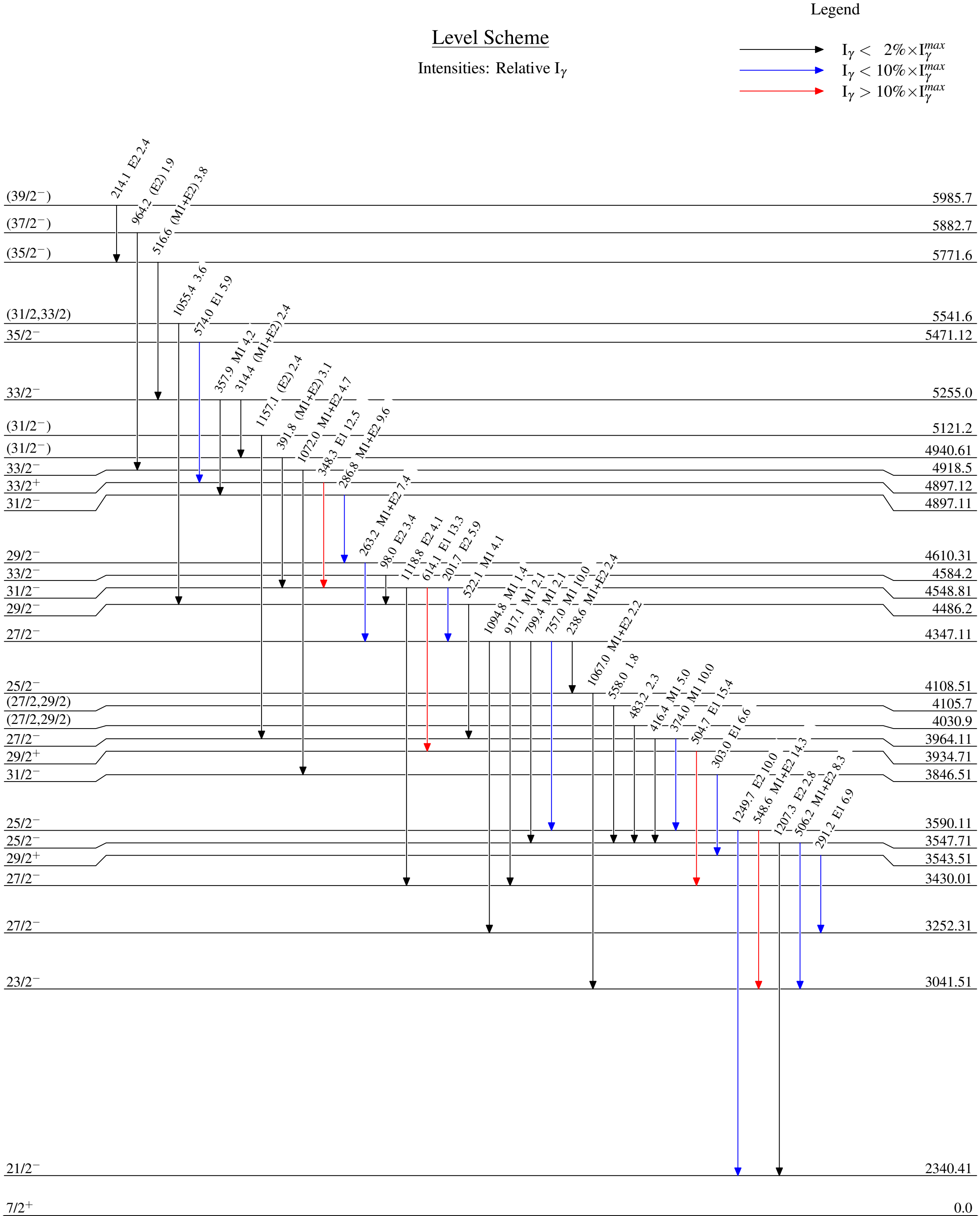
‡ DCO corresponds to gate on ΔJ=1, dipole transition.

Adopted by 2006Ch38 from 1982Ko05.

$^{130}Te(^{11}B,4n\gamma)$ 2006Ch38

Level Scheme

Intensities: Relative I_γ

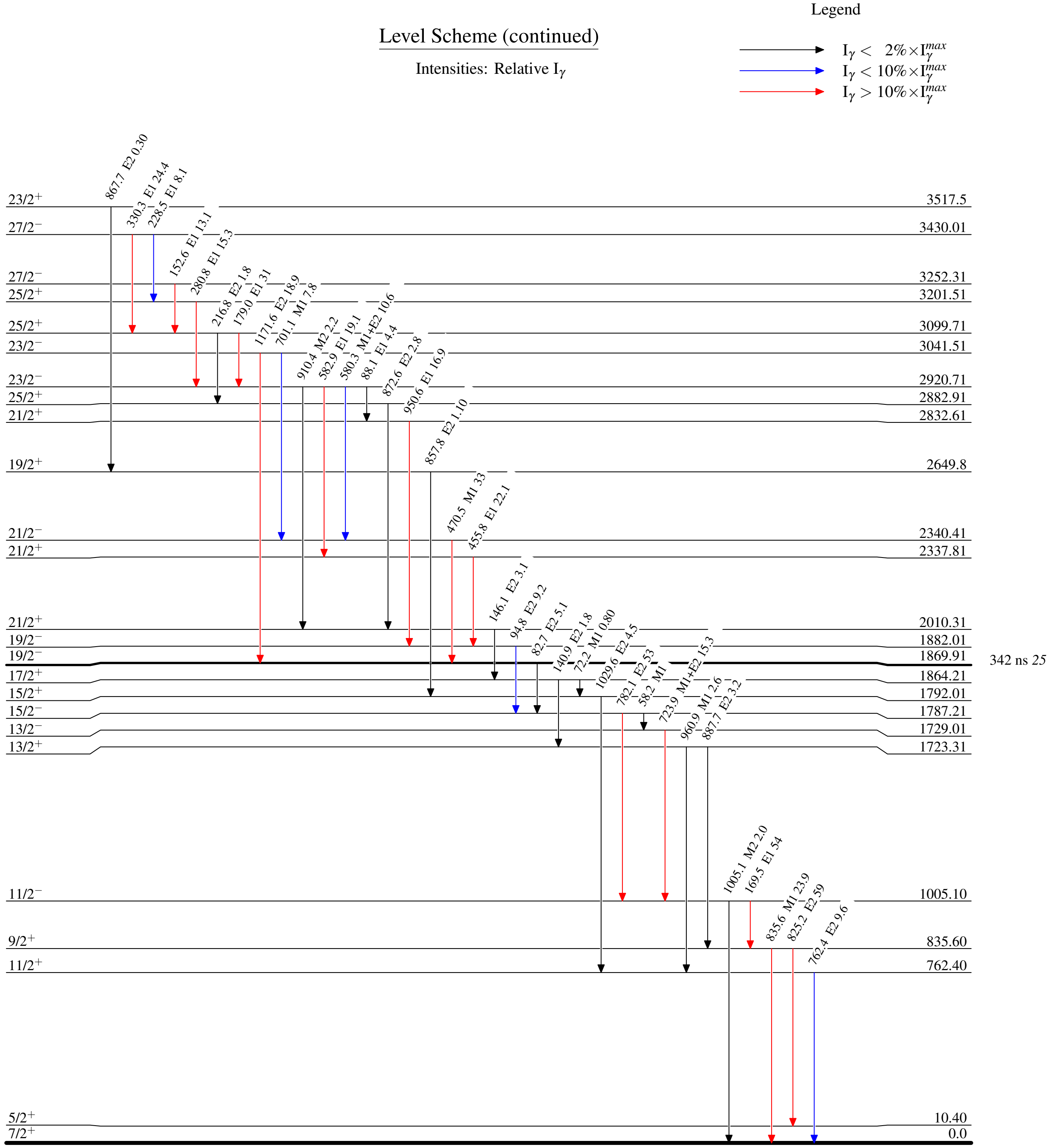


$^{137}_{57}La_{80}$

$^{130}Te(^{11}B,4n\gamma)$ 2006Ch38

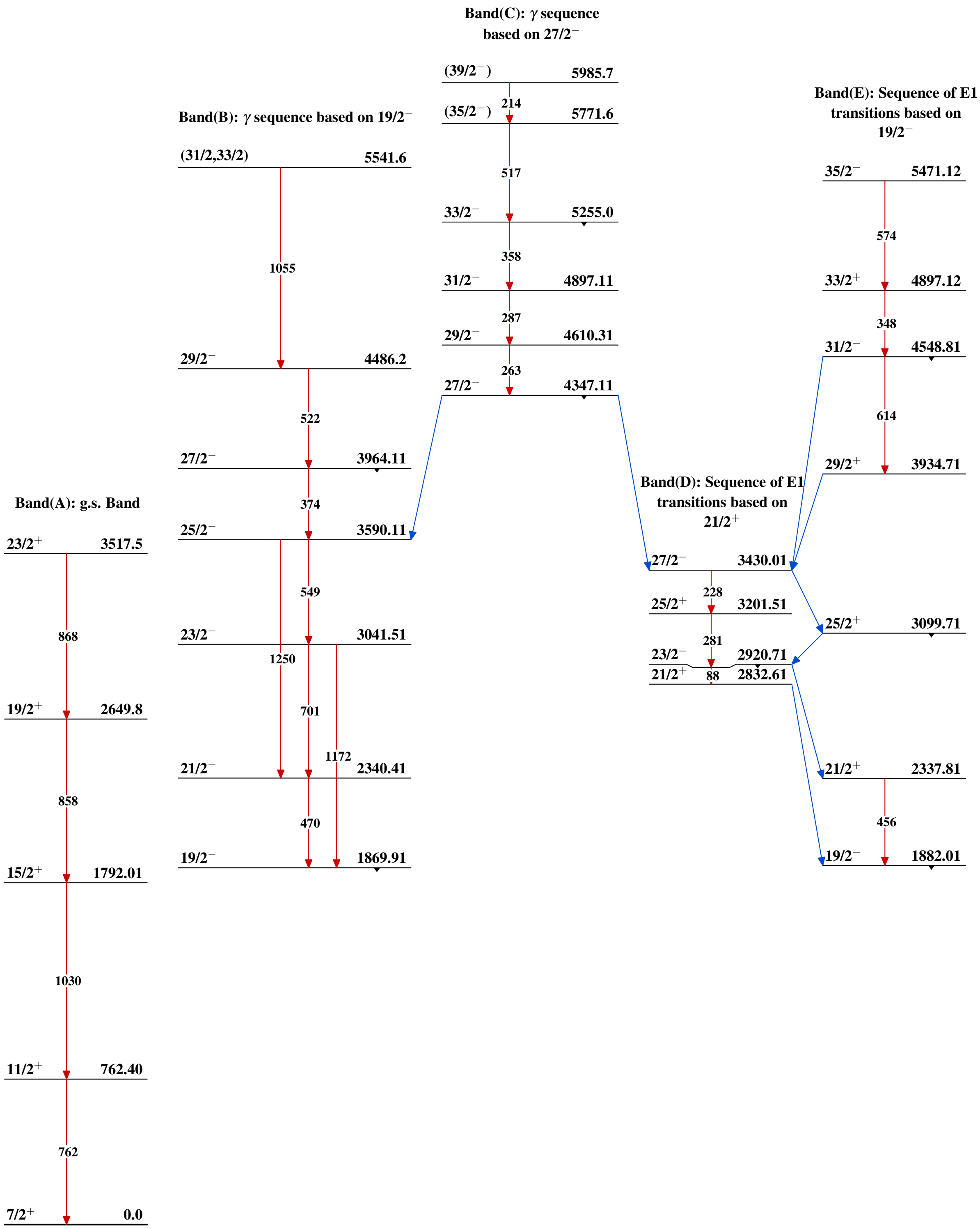
Level Scheme (continued)

Intensities: Relative I_γ



$^{137}_{57}La_{80}$

^{130}Te(^{11}B,4nγ) 2006Ch38



$^{137}_{57}La_{80}$

$^{130}Te(^{11}B,4n\gamma)$ 2006Ch38 (continued)