^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal and F. G. Kondev	NDS 113, 1315 (2012)	1-Aug-2011

2007Pa34: E(^{58}Ni)= 250 MeV. Target: 500 μg/cm^2 thick, isotropically enriched to >97% ^{58}Ni. ^{58}Ni beam was provided by the 88 in. cyclotron at Lawrence Berkeley National Laboratory. γ-rays were detected using Gammasphere γ-ray spectrometer, containing 83 HPGe detectors. Microball charged-particle detector, containing 95CsI(Tl) scintillator, and an array of 15 neutron detectors in conjunction with Gammasphere were used to provide clean-exit channel selection. Measured: Eγ, Iγ, $\gamma\gamma(\theta)$. Deduced: Energy levels, mult, J^π.

2006Ev01,2007Pa35: Two experiments were performed by the same collaboration in 2007Pa34 using same reaction and same experimental set-up. In the first experiment the same beam and target combination in 2007Pa34 was used. In a second experiment, a 240 MeV ^{58}Ni beam was impinged onto a 1mg/cm^2 ^{58}Ni target with a 15mg/cm^2 thick ^{208}Pb backing to facilitate lifetime measurements using DSAM. Measured: Eγ, Iγ, T$_{1/2}$, $\gamma\gamma(\theta)$, linear pol. Deduced: B(E2)/B(M1), B(E1), B(M1), Q$_t$.

Other: 1994Pa21: E(^{58}Ni)= 250 MeV. Target: 1 μg/cm^2 thick ^{58}Ni with a thick ^{197}Au backing. The beam was provided by the Tandem Accelerator Superconducting Cyclotron facility at the Chalk River Laboratories of AECL Research. γ-rays were detected using 8π spectrometer consisting of 20 Compton-suppressed HPGe detectors and a 71-element BGO inner ball calorimeter. Measured: Eγ, Iγ, $\gamma\gamma(\theta)$(DCO). Deduced: Energy levels, mult, J^π.

^{110}Te Levels

In the following, STB stands for "Smooth Terminating Band".

E(level)[†]	J^{π}[‡]	Comments
0.0[@]	0+	
657.2[@] *3*	2+	
1401.8[@] *4*	4+	
1578.3[h] *4*	2+	
1915.0[e] *4*	4+	
2191.4[h] *4*	4+	
2225.9[@] *4*	6+	
2439.9[e] *4*	6+	
2519.7[i] *4*	6+	
2797.7[h] *5*	6+	
3088.1[e] *5*	8+	
3093.4[i] *5*	7+	
3287.7[@] *5*	8+	
3346.3[i] *5*	8+	
3507.0[b] *5*	7−	
3612.5[c] *5*	8−	
3735.0[b] *5*	9−	
3781.2[e] *5*	10+	
4165.9[c] *5*	10−	B(M1)/B(E2)=0.05 *1*, g_K-g_R=0.12 *1*.
4352.7[b] *5*	11−	B(M1)/B(E2)=0.17 *5*, g_K-g_R=0.22 *4*.
4504.1[e] *5*	12+	
4655.7[&] *5*	10+	
4836.9[c] *5*	12−	B(M1)/B(E2)=0.12 *3*, g_K-g_R=0.19 *2*.
5080.4[b] *5*	13−	B(M1)/B(E2)=0.19 *8*, g_K-g_R=0.24 *3*.
5188.3[&] *5*	12+	
5281.1[e] *5*	14+	
5558.7[c] *5*	14−	B(M1)/B(E2)=0.20 *4*, g_K-g_R=0.24 *3*.

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$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01 (continued)

^{110}Te Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
5866.2[b] *5*	15^-		B(M1)/B(E2)=0.11 *4*, g_K-g_R=0.18 *3*.
5875.5[&] *5*	14^+		B(E1)/B(E2)=0.15×10^{-6} *2*, D_0=0.060 *9* (e fm).
6128.1[e] *12*	(16^+)		
6541.2[c] *5*	16^-		
6638.7[&] *5*	16^+		B(E1)/B(E2)=0.12×10^{-6} *1*, D_0=0.037 *3* (e fm).
6859.6[b] *5*	17^-		B(M1)/B(E2)=0.15 *2*, g_K-g_R=0.21 *1*.
6901.4[a] *6*	$16^{(+)}$		
6949.8[g] *6*	16^+		
7209.9[d] *6*	$17^{(-)}$		
7582.4[&] *6*	18^+		
7584.8[c] *6*	18^-		
7626.6[a] *6*	$18^{(+)}$		B(E1)/B(E2)=0.63×10^{-6} *6*, D_0=0.087 *9* (e fm) from 1994Pa21.
7725.1[j] *6*	16^-		
7820.0[g] *6*	18^+		
7846.5[b] *6*	19^-		
8110.0[k] *6*	17^-		
8133.9[d] *6*	$19^{(-)}$		
8344.8[f] *6*	20^+		
8439.2[a] *6*	$20^{(+)}$		B(E1)/B(E2)=1.31×10^{-6} *11*, D_0=0.126 *10* (e fm).
8445.2[j] *6*	18^-		
8590.4[&] *6*	20^+		
8699.9[c] *9*	20^-		
8787.0[k] *6*	19^-		
8791.6 *6*	19^-		
8943.0[b] *6*	21^-		
9164.1[j] *6*	20^-		
9189.9[d] *7*	(21^-)		
9228.8[f] *7*	22^+		
9409.7[a] *6*	$22^{(+)}$		B(E1)/B(E2)=1.7×10^{-6} *5*, D_0=0.14 *5* (e fm).
9560.5[k] *6*	21^-	0.37 ps *+17−14*	Q_t=2.7 *+7−5*.
9622.4 *12*			
9684.8[&] *7*	22^+		
9992.5[j] *6*	22^-	0.24 ps *+9−10*	Q_t=2.9 *+8−4*.
10046.0[b] *7*	(23^-)		
10202.8[f] *12*			
10302.2[d] *7*	(23^-)		
10455.7[k] *7*	23^-	0.17 ps *6*	Q_t=2.8 *+6−4*.
10471.8[a] *7*	$24^{(+)}$		
10723.8 *12*			
10745.4 *16*			
10790.8[&] *7*	24^+		
10943.9[j] *7*	24^-		
11369.6[a] *7*	$26^{(+)}$		
11483.8[k] *7*	25^-		
11543.1 *7*	$26^{(+)}$		Feeds $24^{(+)}$ member of the band based on 6901, $16^{(+)}$.
11839.8 *16*			
12025.9[j] *7*	26^-		
12083.9[&] *8*	(26^+)		

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^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

^{110}Te Levels (continued)

E(level)[†]	J^{π}[‡]	Comments
12368.6[a] *8*	28$^{(+)}$	
12417.8 *8*	28$^{(+)}$	Feeds 26$^{(+)}$ member of the band based on 6901, 16$^{(+)}$.
12603.6[k] *7*	27$^-$	
13214.9[j] *7*	28$^-$	
13843.4[k] *7*	29$^-$	
14517.2[j] *7*	30$^-$	
15210.2[k] *8*	31$^-$	
15986.6[j] *8*	32$^-$	
16778.2[k] *8*	33$^-$	
17625.3[j] *8*	34$^-$	
18475.3[k] *8*	35$^-$	
19545.3[j] *9*	36$^-$	
20637.3[k] *9*	37$^-$	
x[l]	(25$^+$)	Additional information 1. J^{π}: From configuration assignments based on theoretical calculations.
461.24+x[m] *24*	(26$^+$)	
985.26+x[l] *24*	(27$^+$)	
1505.2+x[m] *3*	(28$^+$)	
2065.7+x[l] *3*	(29$^+$)	
2647.7+x[m] *4*	(30$^+$)	
3257.4+x[l] *4*	(31$^+$)	
3907.5+x[m] *4*	(32$^+$)	
4579.5+x[l] *5*	(33$^+$)	
5301.7+x[m] *5*	(34$^+$)	
6076.8+x[l] *5*	(35$^+$)	
6900.6+x[m] *5*	(36$^+$)	
7745.0+x[l] *5*	(37$^+$)	
8639.1+x[m] *6*	(38$^+$)	
9656.5+x[l] *6*	(39$^+$)	
10737.1+x?[m] *6*	(40$^+$)	
y[n]	(26$^+$)	Additional information 2. J^{π}: From configuration assignments based on theoretical calculations.
1109.0+y[n] *3*	(28$^+$)	
2325.6+y[n] *5*	(30$^+$)	
3656.3+y[n] *6*	(32$^+$)	
5119.7+y[n] *6*	(34$^+$)	
6745.2+y[n] *7*	(36$^+$)	
8550.7+y[n] *8*	(38$^+$)	
10560.7+y[n] *8*	(40$^+$)	
12802.8+y[n] *9*	(42$^+$)	
15271.0+y[n] *9*	(44$^+$)	
z[o]	(27$^-$)	Additional information 3. J^{π}: From configuration assignments based on theoretical calculations and from the observed decay-out intensity below 1533γ transition. However, no discrete transitions were observed carrying this intensity.
1177.7+z[o] *3*	(29$^-$)	
2494.1+z[o] *5*	(31$^-$)	
3939.1+z[o] *6*	(33$^-$)	
5472.1+z[o] *6*	(35$^-$)	
7005.1+z[o] *7*	(37$^-$)	

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^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

^{110}Te Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
8663.8+z[o] 8	(39$^-$)	
10501.1+z[o] 8	(41$^-$)	
12542.2+z[o] 9	(43$^-$)	
14813.3+z[o] 9	(45$^-$)	
u[p]	(30$^-$)	Additional information 4. J$^{\pi}$: From configuration assignments based on theoretical calculations and from the observed decay-out intensity below 1654γ transition. However, no discrete transitions were observed to link this band to low-spin level scheme.
1372.0+u[p] 3	(32$^-$)	
2824.0+u[p] 5	(34$^-$)	
4364.0+u[p] 6	(36$^-$)	
6018.0+u[p] 6	(38$^-$)	
7817.1+u[p] 7	(40$^-$)	
9819.1+u[p] 8	(42$^-$)	
12086.1+u[p] 8	(44$^-$)	
v[q]	(29$^+$)	Additional information 5. J$^{\pi}$: From configuration assignments based on theoretical calculations. This band strongly feeds the positive parity band starting at 4655.7 keV through bands at 8344.8 keV (J^{π}=(20$^+$)) and 6949.8 keV (J^{π}= 16$^+$). However, no discrete transitions were observed to link these bands.
1125.6+v[q] 3	(31$^+$)	
2427.7+v[q] 5	(33$^+$)	
3916.7+v[q] 6	(35$^+$)	
5566.0+v[q] 6	(37$^+$)	
7435.9+v[q] 7	(39$^+$)	
9517.9+v[q] 8	(41$^+$)	

[†] From least-squares fit to Eγ's.
[‡] From the deduced γ-ray transition multipolarities using $\gamma\gamma(\theta)$ and polarization, and the observed band structures in 2007Pa34, unless otherwise stated.
[#] From DSAM in 2006Ev01.
[@] Band(A): g.s. band.
[&] Band(B): $\nu h^2_{11/2}$ band.
[a] Band(C): Band based on 16$^{(+)}$ level at 6901 keV.
[b] Band(D): $\nu g_{7/2}\otimes\nu h_{11/2}$, α=1 band.
[c] Band(d): $\nu g_{7/2}\otimes\nu h_{11/2}$, α=0 band.
[d] Band(E): Band based on 17$^{(-)}$ level at 7209.9 keV.
[e] Band(F): $\nu h^2_{11/2}$ band.
[f] Band(G): Band based on 20$^+$ level at 8344.8 keV.
[g] Band(H): Band based on 16$^+$ level at 6949.8 keV.
[h] Band(I): Band based on 2$^+$ level at 1578.3 keV.
[i] Band(J): Band based on 6$^+$ level at 2519.7 keV.
[j] Band(K): STB-1 band, α=0 Configuration=$\pi g^{-1}_{9/2}\otimes\pi h^1_{11/2}\otimes\nu h^2_{11/2}$. Terminating state=$\pi[(g_{9/2})^{-1}(h_{11/2})^1(g_{7/2}d_{5/2})^2]\otimes\nu[(h_{11/2})^2(g_{7/2}d_{5/2})^6]$; J^{π}=38$^-$.
[k] Band(k): STB-1 band, α=1 Configuration=$\pi g^{-1}_{9/2}\otimes\pi h^1_{11/2}\otimes\nu h^2_{11/2}$. Terminating state=$\pi[(g_{9/2})^{-1}(h_{11/2})^1(g_{7/2}d_{5/2})^2]\otimes\nu[(h_{11/2})^2(g_{7/2}d_{5/2})^6]$; J^{π}=37$^-$.
[l] Band(l): STB-2 band, α=1 Configuration=$\pi g^{-1}_{9/2}\otimes\pi h^1_{11/2}\otimes\nu h^3_{11/2}$. Terminating state=$\pi[(g_{9/2})^{-1}(h_{11/2})^1(g_{7/2}d_{5/2})^2]\otimes\nu[(h_{11/2})^3(g_{7/2}d_{5/2})^5]$; J^{π}=41$^+$.

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^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

^{110}Te Levels (continued)

[m] Band(L): STB-2 band, α=0 Configuration=$\pi g_{9/2}^{-1}\otimes\pi h_{11/2}^{1}\otimes\nu h_{11/2}^{3}$. Terminating state=$\pi[(g_{9/2})^{-1}(h_{11/2})^{1}(g_{7/2}d_{5/2})^{2}]\otimes\nu[(h_{11/2})^{3}(g_{7/2}d_{5/2})^{5}]$; $J^{\pi}=40^{+}$.

[n] Band(M): STB-3 band Configuration=$\pi g_{9/2}^{-2}\otimes\pi h_{11/2}^{2}\otimes\nu h_{11/2}^{2}$. Terminating state=$\pi[(g_{9/2})^{-2}(h_{11/2})^{2}(g_{7/2}d_{5/2})^{2}]\otimes\nu[(h_{11/2})^{2}(g_{7/2}d_{5/2})^{6}]$; $J^{\pi}=46^{+}$.

[o] Band(N): STB-4 band Configuration=$\pi g_{9/2}^{-2}\otimes\pi h_{11/2}^{2}\otimes\nu h_{11/2}^{3}$. Terminating state=$\pi[(g_{9/2})^{-2}(h_{11/2})^{2}(g_{7/2}d_{5/2})^{2}]\otimes\nu[(h_{11/2})^{3}(g_{7/2}d_{5/2})^{5}]$; $J^{\pi}=49^{-}$.

[p] Band(O): STB-5 band Configuration=$\pi g_{9/2}^{-2}\otimes\pi h_{11/2}^{2}\otimes\nu h_{11/2}^{3}$. Terminating state=$\pi[(g_{9/2})^{-2}(h_{11/2})^{2}(g_{7/2}d_{5/2})^{2}]\otimes\nu[(h_{11/2})^{3}(g_{7/2}d_{5/2})^{5}]$; $J^{\pi}=49^{-}$.

[q] Band(P): STB-6 band Configuration=$\pi g_{9/2}^{-2}\otimes\pi h_{11/2}^{1}\otimes\nu h_{11/2}^{3}$.

γ(^{110}Te)

R(angular): Asymmetry ratio at angles≈90° and≈50° (or 130°), see footnote.

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	Comments
122.9 3	1.40 14	3735.0	9⁻	3612.5	8⁻	M1+E2	R(Angular)=0.33 4.
186.4 3	<1	4352.7	11⁻	4165.9	10⁻		
214.2 3	3.6 4	2439.9	6⁺	2225.9	6⁺	M1+E2	R(Angular)=0.56 4. Mult.: ΔJ=0 transition.
228.0 3	5.2 5	3735.0	9⁻	3507.0	7⁻	E2	R(Angular)=0.89 4.
238.0 3	3.4 3	7820.0	18⁺	7582.4	18⁺		
242.9 3	2.0 2	5080.4	13⁻	4836.9	12⁻	M1+E2	R(Angular)=0.47 2.
244[‡]		8943.0	21⁻	8699.9	20⁻		
252.8 3	2.3 23	3346.3	8⁺	3093.4	7⁺	M1+E2	R(Angular)=0.60 2.
262.0 3	1.80 18	7846.5	19⁻	7584.8	18⁻	M1+E2	R(Angular)=0.81 15.
265.7 3	1.70 17	3612.5	8⁻	3346.3	8⁺	E1	R(Angular)=1.19 5. Mult.: ΔJ=0 transition.
278.0 3	<1	5558.7	14⁻	5281.1	14⁺		
293.4 3	9.8 10	2519.7	6⁺	2225.9	6⁺	M1+E2	R(Angular)=0.84 2. POL=−0.02 10. Mult.: ΔJ=0 transition.
295.8 3	1.30 13	3093.4	7⁺	2797.7	6⁺	M1+E2	R(Angular)=0.40 4.
307.2 3	1.40 14	5866.2	15⁻	5558.7	14⁻	M1+E2	R(Angular)=0.56 4.
308.9 3	1.20 12	7209.9	17⁽⁻⁾	6901.4	16⁽⁺⁾		
311.0 3	4.5 5	6949.8	16⁺	6638.7	16⁺		
318.8 3	1.30 13	6859.6	17⁻	6541.2	16⁻	M1+E2	R(Angular)=0.74 4.
324.6 3	1.0 1	3612.5	8⁻	3287.7	8⁺	E1	R(Angular)=0.84 4. Mult.: ΔJ=0 transition.
328.0 3	6.4 6	2519.7	6⁺	2191.4	4⁺	E2	R(Angular)=0.93 2.
332.8 3	<1	4836.9	12⁻	4504.1	12⁺		
335.3[#] 3	4.6[@#] 3	8445.2	18⁻	8110.0	17⁻	M1+E2	R(Angular)=0.93 5.
341.8[#] 3	3.4[@#] 3	8787.0	19⁻	8445.2	18⁻		
346.1[#] 3	0.21[#] 3	8791.6	19⁻	8445.2	18⁻		
372.3[#] 3	5.0[@#] 3	9164.1	20⁻	8791.6	19⁻	M1+E2	R(Angular)=0.71 3.
377.3[#] 3	7.4[@#] 3	9164.1	20⁻	8787.0	19⁻	M1+E2	R(Angular)=0.67 3.
384.6[#] 3	3.0[@#] 3	8110.0	17⁻	7725.1	16⁻		
385[‡]		4165.9	10⁻	3781.2	10⁺		
388.8 3	23.4 23	3735.0	9⁻	3346.3	8⁺	E1	R(Angular)=0.64 2. POL=+0.39 11.
396.4 3	10.0[@]	9560.5	21⁻	9164.1	20⁻	M1+E2	R(Angular)=0.70 3.
430.9 3	2.9 3	4165.9	10⁻	3735.0	9⁻	M1+E2	R(Angular)=0.75 3; POL=+0.20 19.

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^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

γ(^{110}Te) (continued)

Eγ[†]	Iγ[†]	Ei(level)	$J^π_i$	E_f	$J^π_f$	Mult.[b]	Comments
432.0 *3*	7.6[@] *3*	9992.5	22⁻	9560.5	21⁻	M1+E2	R(Angular)=0.72 *3*.
447.4 *3*	42 *4*	3735.0	9⁻	3287.7	8⁺	E1	R(Angular)=0.64 *2*. POL=+0.02 *9*.
461.2[#] *3*	2.9[@#] *3*	461.24+x	(26⁺)	x	(25⁺)		
463.4[#] *3*	6.6[@#] *3*	10455.7	23⁻	9992.5	22⁻	M1+E2	R(Angular)=0.72 *3*.
466.6 *3*	4.3 *4*	9409.7	22⁽⁺⁾	8943.0	21⁻	E1	R(Angular)=0.59 *2*.
478.6 *3*	2.50 *25*	5558.7	14⁻	5080.4	13⁻	M1+E2	R(Angular)=0.33 *4*.
483.7 *3*	1.50 *15*	4836.9	12⁻	4352.7	11⁻	M1+E2	R(Angular)=0.16 *2*.
488.4[#] *3*	4.6[@#] *3*	10943.9	24⁻	10455.7	23⁻	M1+E2	R(Angular)=0.73 *3*.
494[‡]		3781.2	10⁺	3287.7	8⁺		
512.7 *3*	6.5 *7*	1915.0	4⁺	1401.8	4⁺	M1+E2	R(Angular)=0.51 *3*. Mult.: ΔJ=0 transition.
519.0 *3*	8.3 *8*	3612.5	8⁻	3093.4	7⁺	E1	R(Angular)=0.59 *2*.
519.9 *3*	15.0[@&] *9*	1505.2+x	(28⁺)	985.26+x	(27⁺)		
524.1[#] *3*	6.0[@#] *3*	985.26+x	(27⁺)	461.24+x	(26⁺)		
524.7 *3*	11.8 *12*	2439.9	6⁺	1915.0	4⁺	(E2)	R(Angular)=0.88 *3*. POL=+0.21 *17*. Mult.: R(Angular) and POL are obtained from a composite peak.
525.0 *3*	7.2 *7*	3612.5	8⁻	3088.1	8⁺	E1	R(Angular)=0.88 *3*. POL=+0.21 *17*. Mult.: ΔJ=0 transition.
525.0 *3*	6.1 *6*	8344.8	20⁺	7820.0	18⁺	E2	R(Angular)=0.88 *3*. POL=+0.21 *17*.
533.0 *3*	<1	5188.3	12⁺	4655.7	10⁺		
539.7[#] *3*	2.5[@#] *3*	11483.8	25⁻	10943.9	24⁻	M1+E2	R(Angular)=0.85 *6*.
542.0[#] *3*	1.4[@#] *3*	12025.9	26⁻	11483.8	25⁻	M1+E2	R(Angular)=0.85 *6*.
549.0 *3*	<1	8133.9	19⁽⁻⁾	7584.8	18⁻		
552.8 *3*	14.5 *15*	4165.9	10⁻	3612.5	8⁻	E2	R(Angular)=1.09 *3*.
560.5[#] *3*	10.0[@#]	2065.7+x	(29⁺)	1505.2+x	(28⁺)		
571.6 *3*	1.20 *12*	4352.7	11⁻	3781.2	10⁺		
573.3 *3*	10.0 *10*	3093.4	7⁺	2519.7	6⁺	M1+E2	R(Angular)=0.39 *2*.
576.1 *3*	<1	5080.4	13⁻	4504.1	12⁺		
577.6[#] *3*	3.1[@#] *3*	12603.6	27⁻	12025.9	26⁻		
582.1[#] *3*	7.1[@#] *5*	2647.7+x	(30⁺)	2065.7+x	(29⁺)		
584.9 *3*	<1	5866.2	15⁻	5281.1	14⁺		
592.8 *3*	10.3 *10*	8439.2	20⁽⁺⁾	7846.5	19⁻	E1	R(Angular)=0.58 *2*.
606.5 *3*	1.10 *11*	2797.7	6⁺	2191.4	4⁺	E2	R(Angular)=1.03 *3*.
609.7[#] *3*	8.8[@#] *5*	3257.4+x	(31⁺)	2647.7+x	(30⁺)		
611.1[#] *3*	3.2[@#] *3*	13214.9	28⁻	12603.6	27⁻		
613.0 *3*	2.40 *24*	2191.4	4⁺	1578.3	2⁺	E2	R(Angular)=0.96 *3*.
617.7 *3*	79 *8*	4352.7	11⁻	3735.0	9⁻	E2	R(Angular)=1.04 *2*. POL=+0.55 *9*.
628.7[#] *3*	1.4[@#] *3*	13843.4	29⁻	13214.9	28⁻		
646.5 *3*	11.3 *11*	3735.0	9⁻	3088.1	8⁺	E1	R(Angular)=0.89 *3*. POL=+0.22 *17*.
648.8 *3*	15.6 *16*	3088.1	8⁺	2439.9	6⁺	E2	R(Angular)=0.89 *3*. POL=+0.22 *17*.
649.8[#] *3*	12.2[@&#] *3*	3907.5+x	(32⁺)	3257.4+x	(31⁺)		
657.2 *3*	100	657.2	2⁺	0.0	0⁺	E2	R(Angular)=0.86 *2*. POL=+0.01 *12*.
668.5 *3*	5.9 *6*	7209.9	17⁽⁻⁾	6541.2	16⁻	M1+E2	R(Angular)=0.91 *3*.

Continued on next page (footnotes at end of table)

^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

γ(^{110}Te) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	Comments
670.9 3	9.5 10	4836.9	12⁻	4165.9	10⁻	E2	R(Angular)=0.91 3.
671.6[#] 3	18.4[@&#] 7	4579.5+x	(33⁺)	3907.5+x	(32⁺)		
673.5[#] 3	3.8[@a#] 3	14517.2	30⁻	13843.4	29⁻		
675.0 3	<1	6541.2	16⁻	5866.2	15⁻		
677.0[#] 3	2.5[@#] 3	8787.0	19⁻	8110.0	17⁻		
687.5 3	9.0 9	5875.5	14⁺	5188.3	12⁺	E2	R(Angular)=0.99 2. POL=+0.6 3.
692.8[#] 3	2.6[@&#] 5	15210.2	31⁻	14517.2	30⁻		
693.2 3	2.50 25	3781.2	10⁺	3088.1	8⁺		
719.1[#] 3	6.6[@a#] 4	9164.1	20⁻	8445.2	18⁻		
719.9[#] 3	6.6[@a#] 4	8445.2	18⁻	7725.1	16⁻		
721.9[#] 3	23.5[@a#] 11	5301.7+x	(34⁺)	4579.5+x	(33⁺)		
722.0 3	16.0 16	5558.7	14⁻	4836.9	12⁻	E2	R(Angular)=1.02 6.
723.0 3	<1	4504.1	12⁺	3781.2	10⁺		
723.0 3	<1	7582.4	18⁺	6859.6	17⁻		
725.0 3	<1	7584.8	18⁻	6859.6	17⁻		
725.1 3	11.1 11	7626.6	18⁽⁺⁾	6901.4	16⁽⁺⁾	E2	R(Angular)=1.09 2. POL=+0.65 11.
727.8 3	68 7	5080.4	13⁻	4352.7	11⁻	E2	R(Angular)=1.09 2. POL=+0.65 11.
744.2 3	<1	8590.4	20⁺	7846.5	19⁻		
744.3 3	91 9	1401.8	4⁺	657.2	2⁺	E2	R(Angular)=0.86 2. POL=+0.39 13.
762.2 3	4.3 4	8344.8	20⁺	7582.4	18⁺	E2	R(Angular)=1.29 6.
762.8 3	14.0 14	6638.7	16⁺	5875.5	14⁺	E2	R(Angular)=1.29 6.
766.9 3	18.7 19	7626.6	18⁽⁺⁾	6859.6	17⁻	E1	R(Angular)=0.56 2.
772.5 3	4.4 4	6638.7	16⁺	5866.2	15⁻	E1	R(Angular)=0.63 4.
773.4[#] 3	1.4[@#] 3	9560.5	21⁻	8787.0	19⁻		
775.2[#] 3	4.5[@#] 5	6076.8+x	(35⁺)	5301.7+x	(34⁺)		
776.4[#] 3	1.3[@&#] 4	15986.6	32⁻	15210.2	31⁻		
777.1 3	<1	5281.1	14⁺	4504.1	12⁺		
785.8 3	63 6	5866.2	15⁻	5080.4	13⁻	E2	R(Angular)=1.00 2.
789.5 3	4.4 4	2191.4	4⁺	1401.8	4⁺	M1+E2	R(Angular)=0.53 7. Mult.: ΔJ=0 transition.
791.6[#] 3	1.6[@&#] 4	16778.2	33⁻	15986.6	32⁻		
794.3 3	5.1 5	5875.5	14⁺	5080.4	13⁻	E1	R(Angular)=0.65 3.
812.5 3	16.2 16	8439.2	20⁽⁺⁾	7626.6	18⁽⁺⁾	E2	R(Angular)=1.03 2. POL=+0.46 12.
824.0 3	61 6	2225.9	6⁺	1401.8	4⁺	E2	R(Angular)=0.96 2. POL=+0.34 8.
824.2[#] 3	21.3[@a#] 10	6900.6+x	(36⁺)	6076.8+x	(35⁺)		
826.4 3	22.7 23	3346.3	8⁺	2519.7	6⁺	E2	Mult.: From 1994Pa21.
828.5[#] 3	5.2[@&#] 6	9992.5	22⁻	9164.1	20⁻		
835.5 3	4.2 4	5188.3	12⁺	4352.7	11⁻	E1	R(Angular)=0.59 2.
844.5[#] 3	1.3[@#] 3	7745.0+x	(37⁺)	6900.6+x	(36⁺)		
(847[‡])		6128.1	(16⁺)	5281.1	14⁺		
847.0 3	0.7[@] 2	17625.3	34⁻	16778.2	33⁻		
850.0[#] 3	<0.1[@#]	18475.3	35⁻	17625.3	34⁻		
862.1 3	3.0 3	3088.1	8⁺	2225.9	6⁺	E2	R(Angular)=0.73 6.
870.0 3	6.1 6	7820.0	18⁺	6949.8	16⁺		
875.0 3	1.2 1	12417.8	28⁽⁺⁾	11543.1	26⁽⁺⁾	E2	R(Angular)=1.07 6.

Continued on next page (footnotes at end of table)

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01 (continued)

$\gamma(^{110}Te)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	Comments
884.0 3	4.1 4	9228.8	22^+	8344.8	20^+	E2	R(Angular)=1.26 8.
894.2[#] 3	<0.1[@#]	8639.1+x	(38^+)	7745.0+x	(37^+)		
895.0[#] 3	2.7[@#] 3	10455.7	23^-	9560.5	21^-		
897.5 3	4.0 4	11369.6	$26^{(+)}$	10471.8	$24^{(+)}$		
921.0 3	<1	1578.3	2^+	657.2	2^+		
921.0 3	<1	4655.7	10^+	3735.0	9^-		
924.0 3	3.9 4	8133.9	$19^{(-)}$	7209.9	$17^{(-)}$	E2	R(Angular)=1.12 4.
943.3 3	12.5 13	7582.4	18^+	6638.7	16^+	E2	R(Angular)=1.26 2.
951.4[#] 3	2.9[@#] 3	10943.9	24^-	9992.5	22^-		
970.6 3	21.3 21	9409.7	$22^{(+)}$	8439.2	$20^{(+)}$	E2	R(Angular)=1.05 2. POL=+0.41 16.
(974[‡])		10202.8		9228.8	22^+		
983.4 3	11.9 12	6541.2	16^-	5558.7	14^-	E2	R(Angular)=0.99 2.
985.3[#] 3	1.0[@#] 2	985.26+x	(27^+)	x	(25^+)		
986.9 3	17.6 18	7846.5	19^-	6859.6	17^-	E2	R(Angular)=0.98 2.
993.3 3	42 4	6859.6	17^-	5866.2	15^-	E2	R(Angular)=1.05 2. POL=+0.55 11.
999.0 3	<1	12368.6	$28^{(+)}$	11369.6	$26^{(+)}$		
1007.7 3	11.0 11	8590.4	20^+	7582.4	18^+	E2	R(Angular)=0.97 3.
1027.8[#] 3	2.0[@#] 3	11483.8	25^-	10455.7	23^-		
1032[‡]		9622.4		8590.4	20^+		
1035.5 3	8.6 9	6901.4	$16^{(+)}$	5866.2	15^-	E1	R(Angular)=0.63 2.
1038.4 3	4.1 4	2439.9	6^+	1401.8	4^+		
1039[‡]		10723.8		9684.8	22^+		
1043.8[#] 3	5.6[@#] 5	1505.2+x	(28^+)	461.24+x	(26^+)		
1043.9 3	8.1 8	7584.8	18^-	6541.2	16^-	E2	R(Angular)=1.14 6.
1048.0 3	4.0 4	12417.8	$28^{(+)}$	11369.6	$26^{(+)}$		
1056.0 3	3.1 3	9189.9	(21^-)	8133.9	$19^{(-)}$		
1061.8 3	48 5	3287.7	8^+	2225.9	6^+	E2	R(Angular)=0.95 2. POL=+0.28 8.
1062.1 3	12.9 13	10471.8	$24^{(+)}$	9409.7	$22^{(+)}$	E2	R(Angular)=1.15 5.
1070.0[#d] 3	<0.1[@#]	19545.3	36^-	18475.3	35^-		
1071.5 3	9.3 9	11543.1	$26^{(+)}$	10471.8	$24^{(+)}$	E2	R(Angular)=1.22 5.
1074.2 3	3.2 3	6949.8	16^+	5875.5	14^+		
1080.6[#] 3	3.7[@#] 5	2065.7+x	(29^+)	985.26+x	(27^+)		
1082.5[#] 3	4.2[@#] 3	12025.9	26^-	10943.9	24^-		
1094.4 3	11.5 12	9684.8	22^+	8590.4	20^+	E2	R(Angular)=1.00 4.
1096.4 3	3.9 4	8943.0	21^-	7846.5	19^-	E2	R(Angular)=0.98 4.
1103.0 3	<1	10046.0	(23^-)	8943.0	21^-		
1106.0 3	7.6 8	10790.8	24^+	9684.8	22^+	E2	R(Angular)=1.04 5.
1109.0 3	10.0[@]	1109.0+y	(28^+)	y	(26^+)		
1112.3 3	2.8 3	10302.2	(23^-)	9189.9	(21^-)		
1116[‡]		8699.9	20^-	7584.8	18^-		
1116[‡]		11839.8		10723.8			
1118.0 3	15.4 15	2519.7	6^+	1401.8	4^+	E2	R(Angular)=0.99 3.
1119.5[#] 3	3.5[@#] 3	12603.6	27^-	11483.8	25^-		
1123[‡]		10745.4		9622.4			
1125.6[#] 3	10.0[@#]	1125.6+v	(31^+)	v	(29^+)		
1142.5[#] 3	2.5[@#] 2	2647.7+x	(30^+)	1505.2+x	(28^+)		
1177.7[#] 3	6.2[@#] 5	1177.7+z	(29^-)	z	(27^-)		

Continued on next page (footnotes at end of table)

^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)

γ(^{110}Te) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	Comments
1189.4[#] 3	2.4[@#] 3	13214.9	28⁻	12025.9	26⁻		
1191.5[#] 3	1.4[@#] 2	3257.4+x	(31⁺)	2065.7+x	(29⁺)		
1216.6[#] 3	8.2[@#] 3	2325.6+y	(30⁺)	1109.0+y	(28⁺)		
1239.5[#] 3	2.0[@#] 2	13843.4	29⁻	12603.6	27⁻		
1258.2 3	4.8 5	1915.0	4⁺	657.2	2⁺	E2	R(Angular)=0.92 3.
1259.8[#] 3	2.6[@#] 2	3907.5+x	(32⁺)	2647.7+x	(30⁺)		
1281.1 3	4.5 5	3507.0	7⁻	2225.9	6⁺	E1	R(Angular)=0.50 2.
1293.1 3	1.1 1	12083.9	(26⁺)	10790.8	24⁺		
1302.1[#] 3	9.9[@#] 8	2427.7+v	(33⁺)	1125.6+v	(31⁺)		
1302.4[#] 3	1.7[@#] 3	14517.2	30⁻	13214.9	28⁻		
1316.4[#] 3	6.2[@#] 6	2494.1+z	(31⁻)	1177.7+z	(29⁻)		
1322.4[#] 3	1.6[@#] 2	4579.5+x	(33⁺)	3257.4+x	(31⁺)		
1330.7[#] 3	8.0[@#] 3	3656.3+y	(32⁺)	2325.6+y	(30⁺)		
1367.0[#] 3	1.6[@#] 2	15210.2	31⁻	13843.4	29⁻		
1368.0 3	<1	4655.7	10⁺	3287.7	8⁺		
1372.0 3	7.4[@] 7	1372.0+u	(32⁻)	u	(30⁻)		
1394.4 3	1.5[@] 2	5301.7+x	(34⁺)	3907.5+x	(32⁺)		
1445.0 3	10.0[@]	3939.1+z	(33⁻)	2494.1+z	(31⁻)		
1452.0 3	9.2[@] 7	2824.0+u	(34⁻)	1372.0+u	(32⁻)		
1463.4 3	6.4[@] 3	5119.7+y	(34⁺)	3656.3+y	(32⁺)		
1469.5[#] 3	1.4[@#] 2	15986.6	32⁻	14517.2	30⁻		
1489.0[#] 3	5.3[@#] 5	3916.7+v	(35⁺)	2427.7+v	(33⁺)		
1497.4[#] 3	1.6[@#] 2	6076.8+x	(35⁺)	4579.5+x	(33⁺)		
1533.0[c#] 3	18.8[c@#] 7	5472.1+z	(35⁻)	3939.1+z	(33⁻)		
1533.0[c#] 3	18.8[c@#] 7	7005.1+z	(37⁻)	5472.1+z	(35⁻)		
1540.0 3	10.0[@]	4364.0+u	(36⁻)	2824.0+u	(34⁻)		
1567.8[#] 3	1.2[@&#] 2	16778.2	33⁻	15210.2	31⁻		
1569.2[#] 3	1.2[@&#] 2	8110.0	17⁻	6541.2	16⁻		
1598.6 3	1.1[@] 2	6900.6+x	(36⁺)	5301.7+x	(34⁺)		
1625.5 3	5.4[@] 3	6745.2+y	(36⁺)	5119.7+y	(34⁺)		
1638.7[#] 3	0.8[@#] 2	17625.3	34⁻	15986.6	32⁻		
1649.3[#] 3	6.4[@#] 8	5566.0+v	(37⁺)	3916.7+v	(35⁺)		
1654.0[#] 3	7.0[@#] 6	6018.0+u	(38⁻)	4364.0+u	(36⁻)		
1658.6[#] 3	9.2[@#] 5	8663.8+z	(39⁻)	7005.1+z	(37⁻)		
1668.1[#] 3	0.8[@#] 2	7745.0+x	(37⁺)	6076.8+x	(35⁺)		
1697.2[#] 3	0.7[@#] 2	18475.3	35⁻	16778.2	33⁻		
1738.4[#] 3	0.6[@#] 2	8639.1+x	(38⁺)	6900.6+x	(36⁺)		
1799.0[#] 3	4.6[@#] 5	7817.1+u	(40⁻)	6018.0+u	(38⁻)		
1805.4[#] 3	3.8[@#] 2	8550.7+y	(38⁺)	6745.2+y	(36⁺)		
1837.3[#] 3	7.6[@#] 5	10501.1+z	(41⁻)	8663.8+z	(39⁻)		
1858.4[#] 3	<0.1[@#]	7725.1	16⁻	5866.2	15⁻		
1869.8[#] 3	1.6[@#] 4	7435.9+v	(39⁺)	5566.0+v	(37⁺)		
1904.1[#] 3	0.2[@#] 1	8445.2	18⁻	6541.2	16⁻		
1911.5[#] 3	0.5[@#] 2	9656.5+x	(39⁺)	7745.0+x	(37⁺)		
1920.0[#] 3	<0.1[@#]	19545.3	36⁻	17625.3	34⁻		

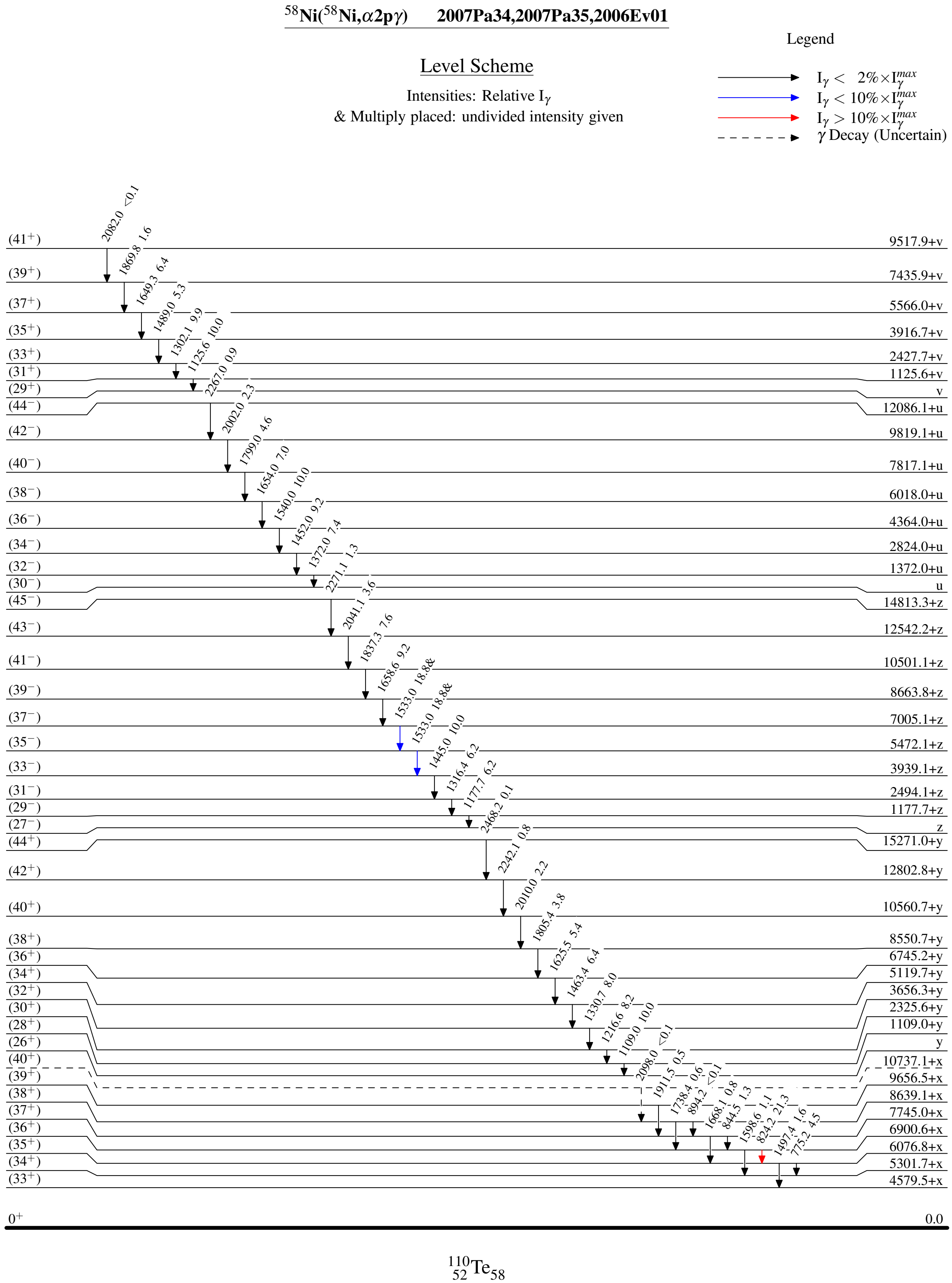
Continued on next page (footnotes at end of table)

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01 (continued)

$\gamma(^{110}Te)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
2002.0[#] 3	2.3[@#] 4	9819.1+u	(42^-)	7817.1+u	(40^-)
2010.0[#] 3	2.2[@#] 2	10560.7+y	(40^+)	8550.7+y	(38^+)
2041.1[#] 3	3.6[@#] 4	12542.2+z	(43^-)	10501.1+z	(41^-)
2082.0[#] 3	<0.1[@#]	9517.9+v	(41^+)	7435.9+v	(39^+)
2098.0[#d] 3	<0.1[@#]	10737.1+x?	(40^+)	8639.1+x	(38^+)
2162.0 3	<0.1[@]	20637.3	37^-	18475.3	35^-
2242.1[#] 3	0.8[@#] 4	12802.8+y	(42^+)	10560.7+y	(40^+)
2267.0[#] 3	0.9[@#] 2	12086.1+u	(44^-)	9819.1+u	(42^-)
2271.1[#] 3	1.3[@#] 2	14813.3+z	(45^-)	12542.2+z	(43^-)
2468.2[#] 3	0.1[@#] 1	15271.0+y	(44^+)	12802.8+y	(42^+)

[†] From 2007Pa34, unless otherwise stated.
[‡] From Figure 5 of 2007Pa34, but not listed by the authors in table I.
[#] From 2007Pa35.
[@] Relative intensities within a particular STB band, normalized to 10 for the most intense transition.
[&] Doublet γ ray, composite intensity is given.
[a] Triplet γ ray, composite intensity is given.
[b] From $\gamma\gamma(\theta)$(DCO) and POL measurements in 2007Pa34, unless otherwise stated. Angular correlation asymmetry ratios were determined by the DCO method at angles of ≈90° and ≈50° (or 130°) with gates on ΔJ=2, quadrupole transitions (mainly the 657.2γ and 744.3γ but some gates on 553γ and 618γ). This ratio here is designated as R(Angular). Expected values of this ratio are ≈1.0 for ΔJ=2, quadrupole and ΔJ=0, dipole transitions; and ≈0.63 for ΔJ=1, dipole transitions.
[c] Multiply placed with undivided intensity.
[d] Placement of transition in the level scheme is uncertain.

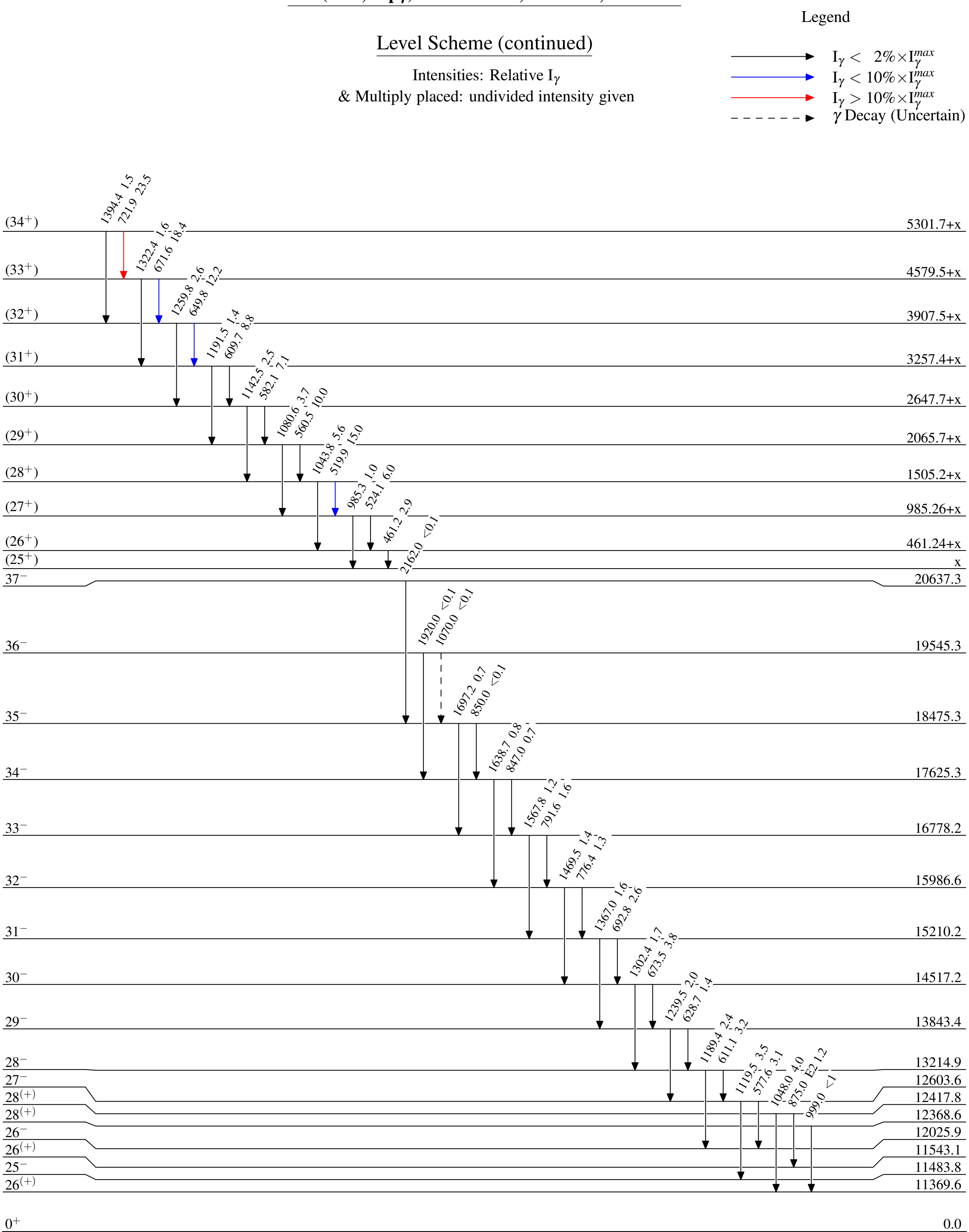

^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01
Legend
Level Scheme
Intensities: Relative Iγ
& Multiply placed: undivided intensity given
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
(41+) 9517.9+v
(39+) 7435.9+v
(37+) 5566.0+v
(35+) 3916.7+v
(33+) 2427.7+v
(31+) 1125.6+v
(29+) v
(44−) 12086.1+u
(42−) 9819.1+u
(40−) 7817.1+u
(38−) 6018.0+u
(36−) 4364.0+u
(34−) 2824.0+u
(32−) 1372.0+u
(30−) u
(45−) 14813.3+z
(43−) 12542.2+z
(41−) 10501.1+z
(39−) 8663.8+z
(37−) 7005.1+z
(35−) 5472.1+z
(33−) 3939.1+z
(31−) 2494.1+z
(29−) 1177.7+z
(27−) z
(44+) 15271.0+y
(42+) 12802.8+y
(40+) 10560.7+y
(38+) 8550.7+y
(36+) 6745.2+y
(34+) 5119.7+y
(32+) 3656.3+y
(30+) 2325.6+y
(28+) 1109.0+y
(26+) y
(40+) 10737.1+x
(39+) 9656.5+x
(38+) 8639.1+x
(37+) 7745.0+x
(36+) 6900.6+x
(35+) 6076.8+x
(34+) 5301.7+x
(33+) 4579.5+x
0+ 0.0
2082.0 <0.1
1869.8 1.6
1649.3 6.4
1489.0 5.3
1302.1 9.9
1125.6 10.0
2267.0 0.9
2002.0 2.3
1799.0 4.6
1654.0 7.0
1540.0 10.0
1452.0 9.2
1372.0 7.4
2271.1 1.3
2041.1 3.6
1837.3 7.6
1658.6 9.2
1533.0 18.8&
1533.0 18.8&
1445.0 10.0
1316.4 6.2
1177.7 6.2
2468.2 0.1
2242.1 0.8
2010.0 2.2
1805.4 3.8
1625.5 5.4
1463.4 6.4
1330.7 8.0
1216.6 8.2
1109.0 10.0
2098.0 <0.1
1911.5 0.5
1738.4 0.6
894.2 <0.1
1668.1 0.8
844.5 1.3
1598.6 1.1
824.2 21.3
1497.4 1.6
775.2 4.5
$^{110}_{52}Te_{58}$

^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01

Level Scheme (continued)

Intensities: Relative I_γ

& Multiply placed: undivided intensity given



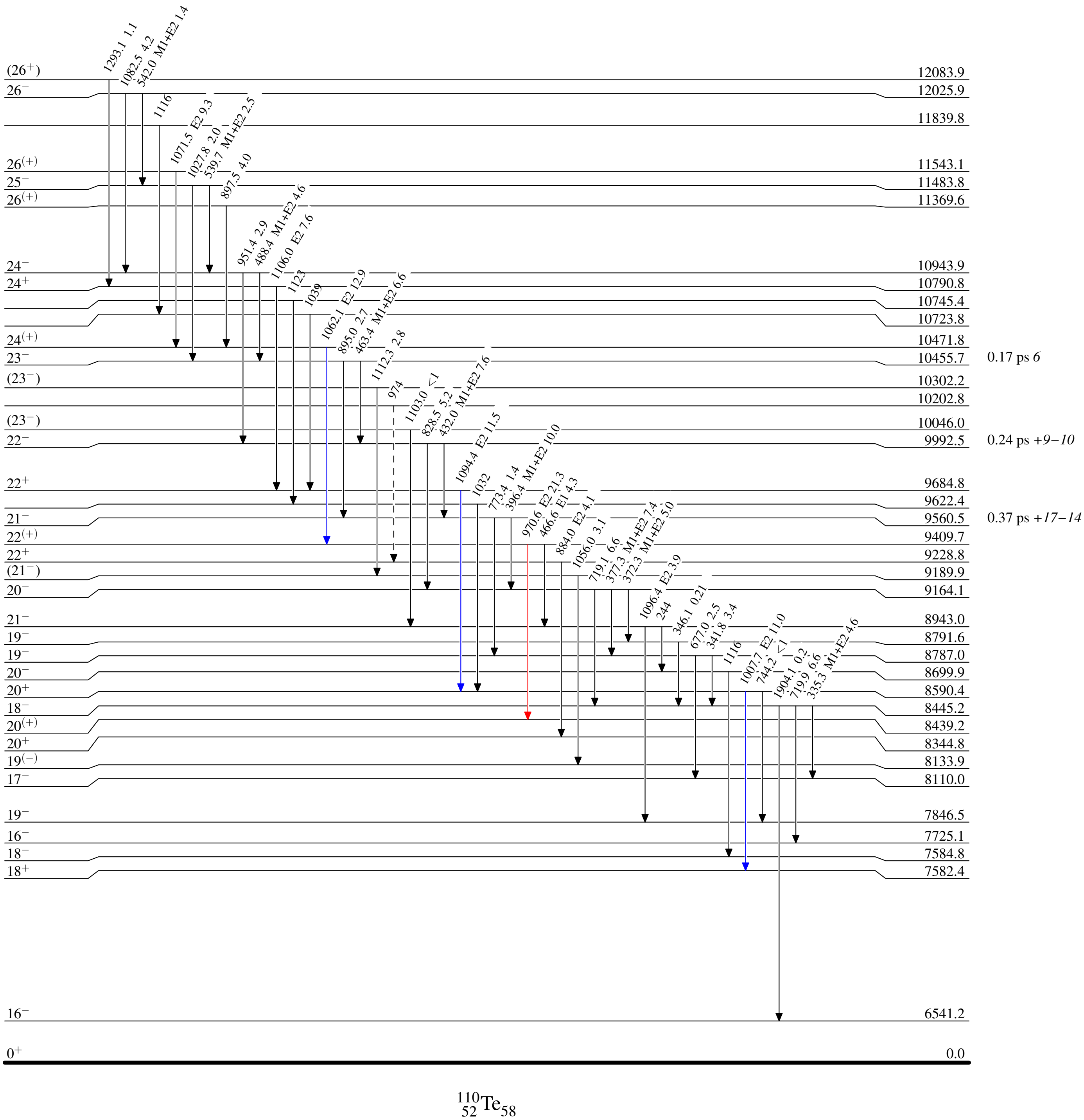
$^{110}_{52}Te_{58}$

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

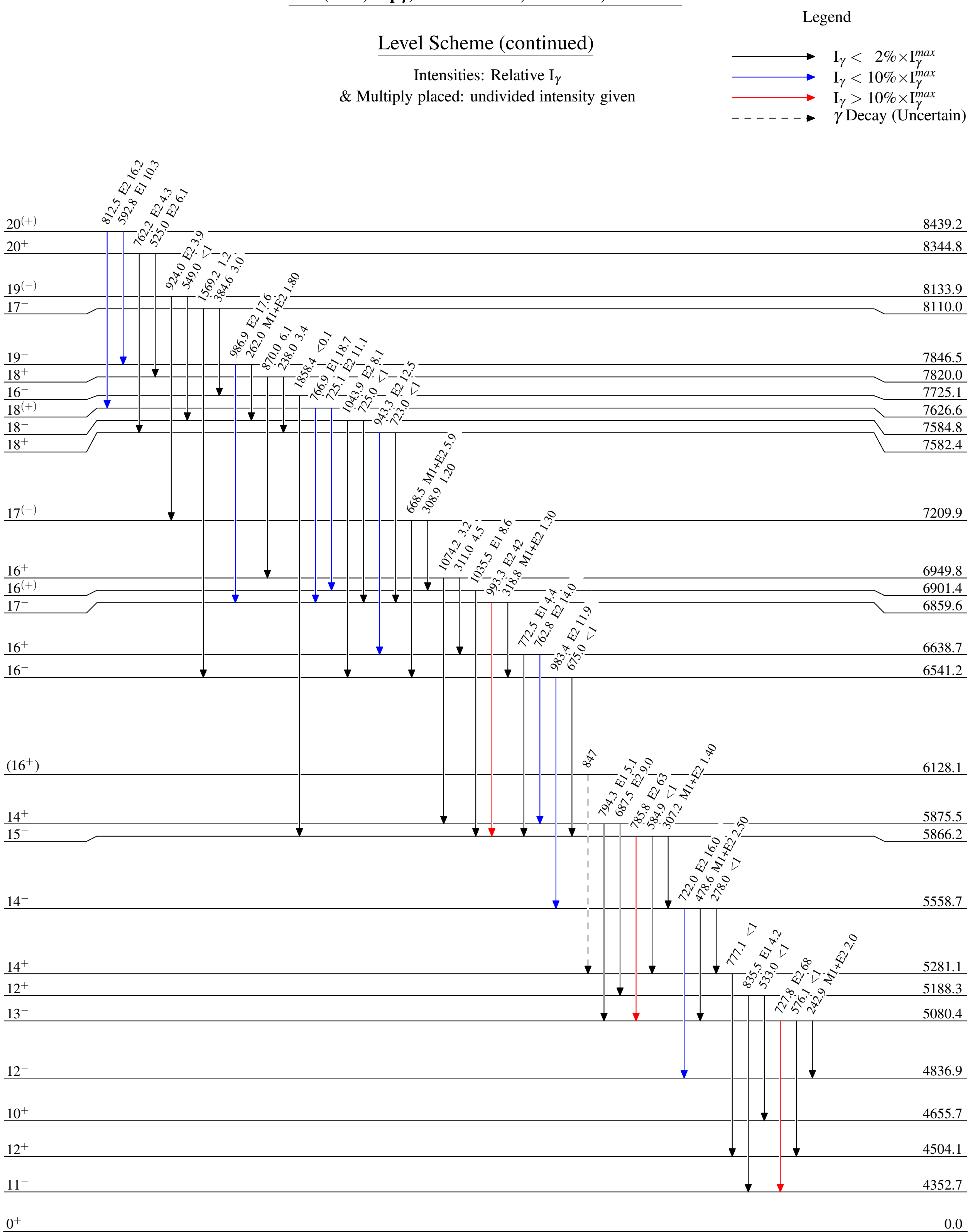
Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



$^{110}_{52}Te_{58}$

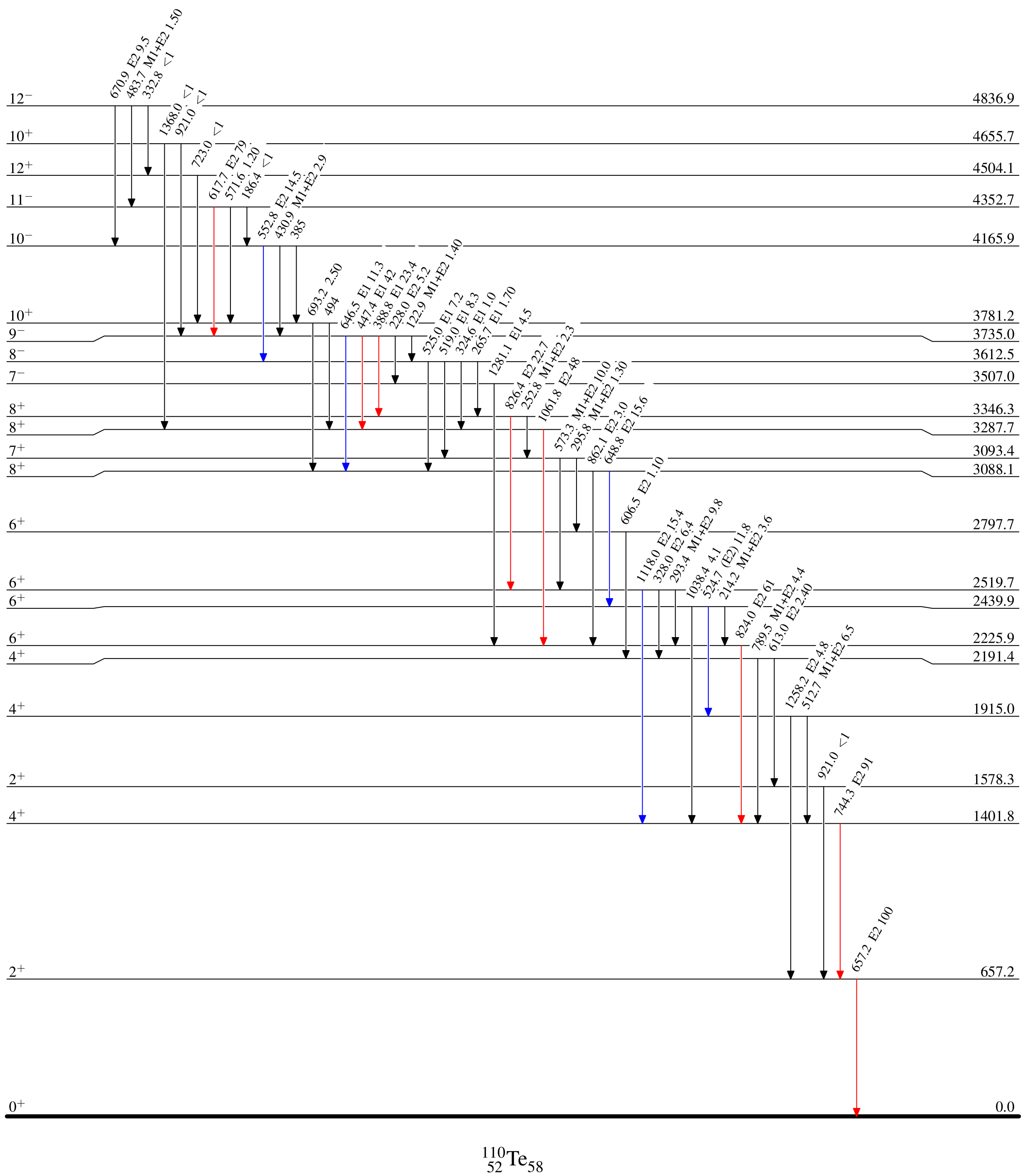
^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

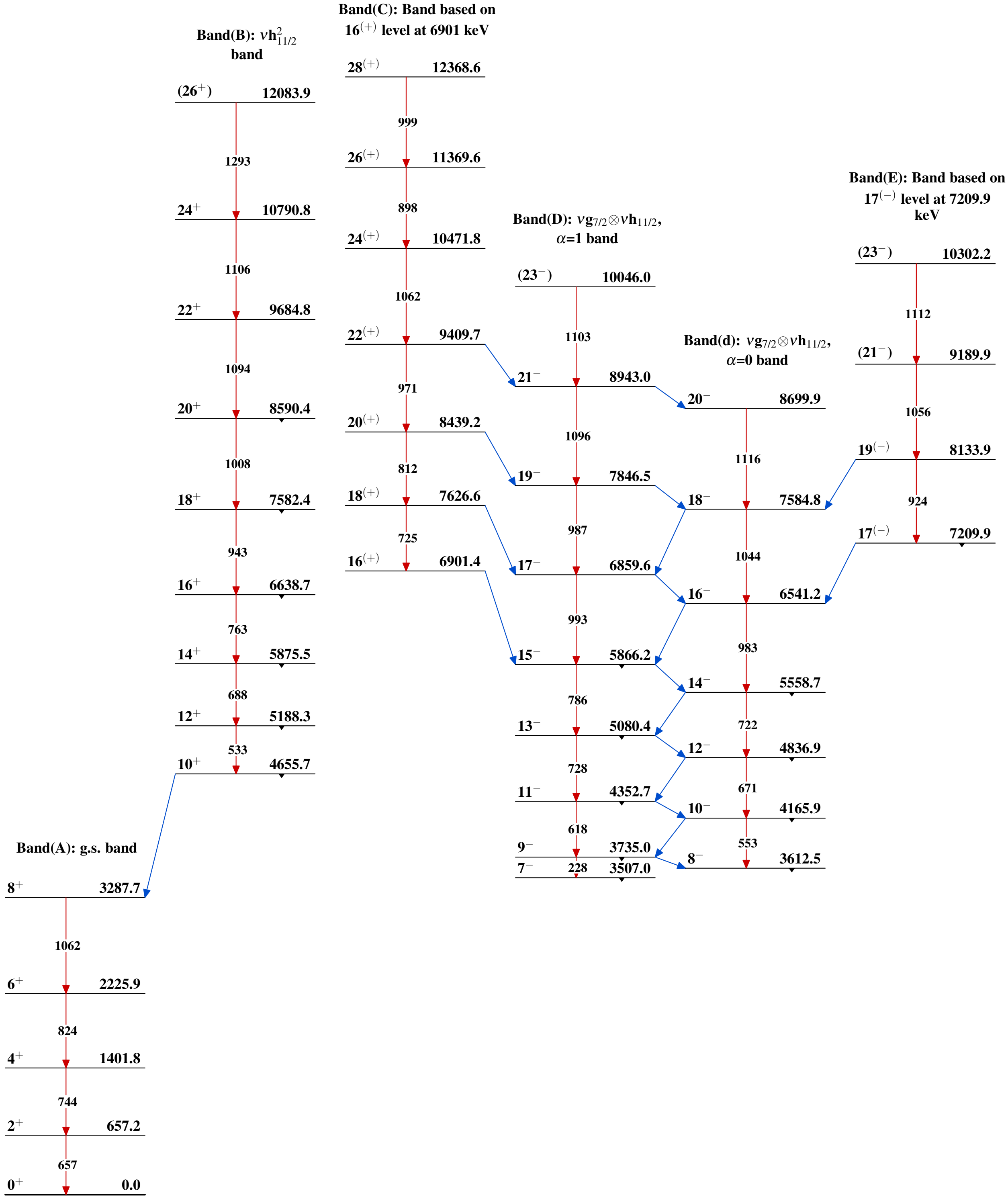
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$



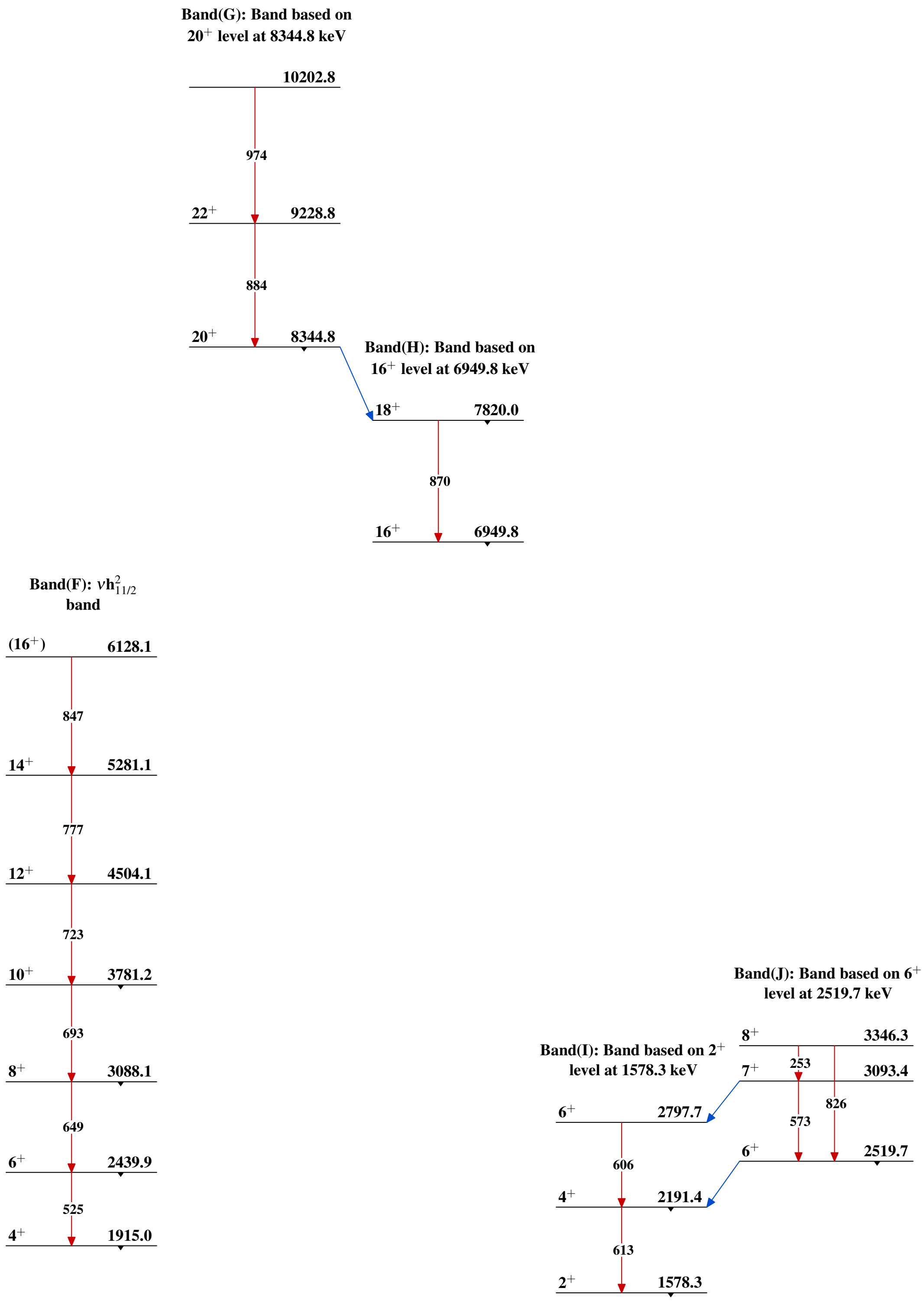
$^{110}_{52}Te_{58}$

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01



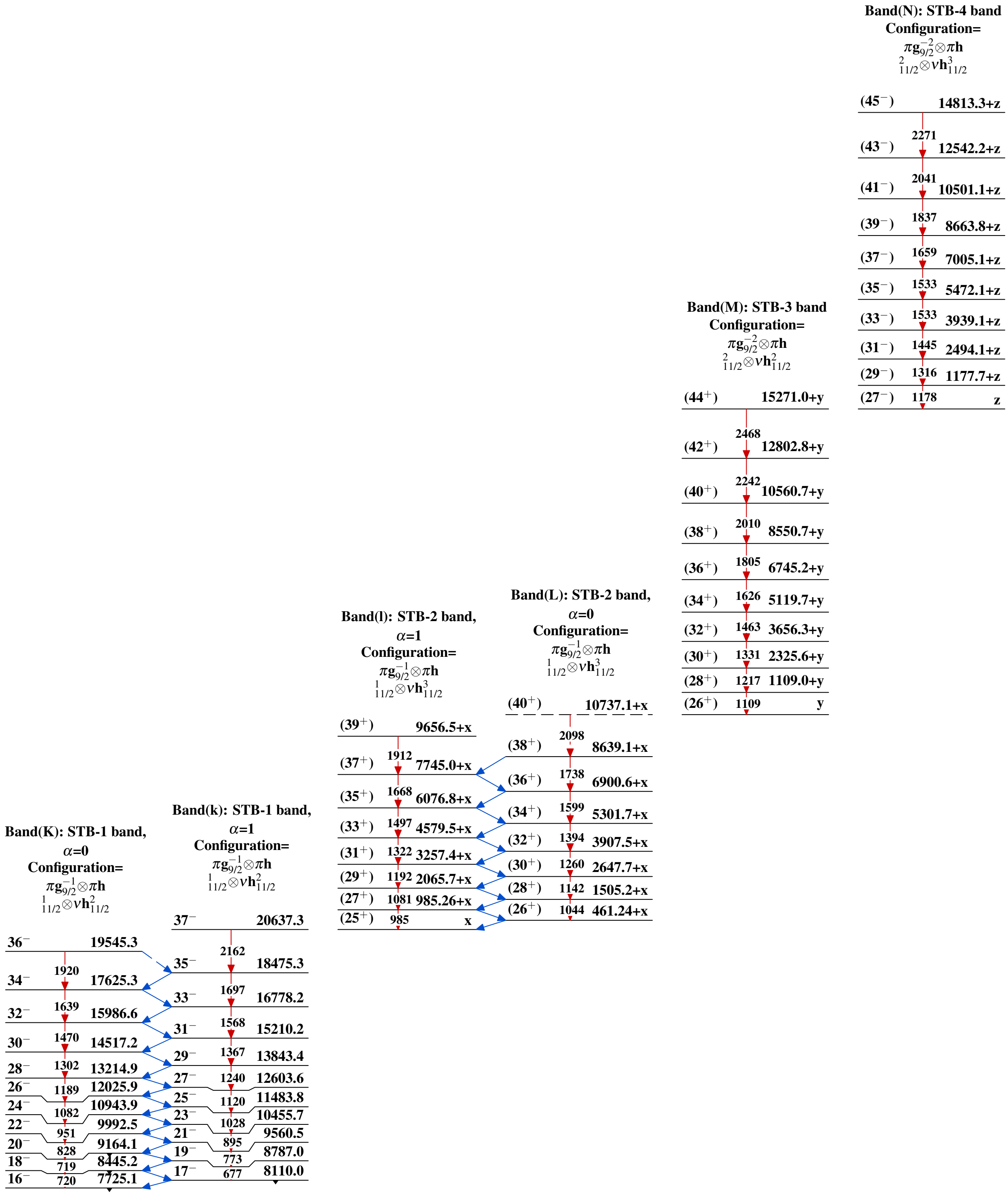
$^{110}_{52}Te_{58}$

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01 (continued)



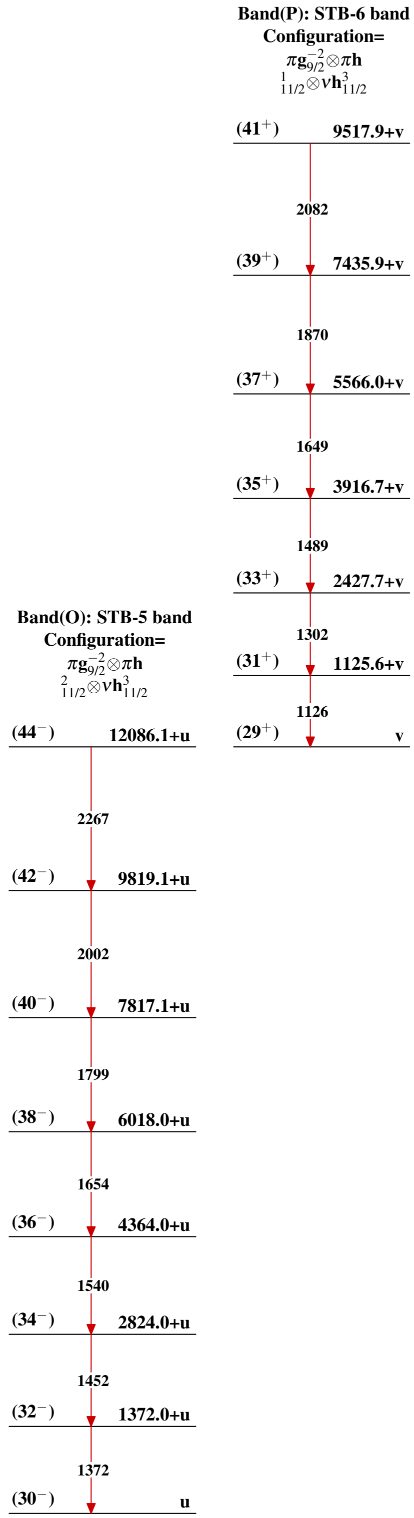
$^{110}_{52}Te_{58}$

$^{58}Ni(^{58}Ni,\alpha 2p\gamma)$ 2007Pa34,2007Pa35,2006Ev01 (continued)



$^{110}_{52}Te_{58}$

^{58}Ni(^{58}Ni,α2pγ) 2007Pa34,2007Pa35,2006Ev01 (continued)



$^{110}_{52}Te_{58}$