

$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06

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The level scheme is that proposed by 1994Ti01 and 1997Se06 on the basis of $\gamma\gamma$ -coincidence, transition intensities, energy sums and DCO ratios. Possible quasi-particle configurations of base states of bands were proposed from a cranked shell model approach (1994Ti01). see also $^{122}\text{Te}(\alpha,4n\gamma)$, $^{122}\text{Te}(^3\text{He},3n\gamma)$ and $^{110}\text{Pd}(^{16}\text{O},4n\gamma)$.

1991Si12: $^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ E(^{30}Si)=135 MeV; ^{96}Zr self supporting and evaporated target on Au foil; TESSA3 array Compton suppressed Ge spectrometer with BGO shielding detector arrangement; measured γ summed energy multiplicity data, triple $\gamma(\theta)$; extended the collective band structures of 1987Ha03, proposing additional 2 bands, and splitting of s-band.

1994Ti01: $^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ E(^{30}Si)=135 MeV; used the same facility as 1991Si12. 50 element BGO calorimeter, 16 escape suppressed spectrometers; measured E γ , I γ , DCO ratios; deduced level scheme consisting of 10 bands; discussed band crossings, band splitting, quasi-particle, single particle configurations, shape competition and band termination.

1997Se06: $^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ E(^{30}Si)=135 MeV; almost same reaction conditions with 1994Ti01, used EUROGAM Ge coincidence arrays with 45 escape suppressed spectrometers; measured E γ , I γ , $\gamma\gamma$ -coincidence, DCO; deduced B(M1)/B(E2) ratios; extended the band structures of 1994Ti01.

1972Ku14: $^{110}\text{Pd}(^{16}\text{O},4n\gamma)$ E(^{16}O)=75,80 MeV; semi γ ; deduced T $_{1/2}$ from Doppler-shift attenuation.

Other older experiments: $^{115}\text{In}(^{11}\text{B},4n\gamma)$ (1967Cl02); $^{122}\text{Te}(\alpha,4n\gamma)$ (1965Mo10).

2005Ny02: $^{64}\text{Ni}(^{64}\text{Ni},2n)^{126}\text{Ba}$, E(^{64}Ni)=255, 261 MeV; EUROBALL γ -ray spectrometer and DIAMANT ancillary detector system; measured the delayed α -xn channel γ spectra. 2005Ny02 conjecture a narrow ridge structure appeared in α -2n channel γ spectra could be interpreted as an evidence of hyperdeformed states (E=1440 keV 82 or 122, J up to 34-56).

^{122}Xe Levels

E(level) [†] #	J π [‡]	Comments
0.0@	0 ⁺	
331.30@ 10	2 ⁺	
828.70@ 14	4 ⁺	
843.20 ^c 14	(2 ⁺)	
1214.6 ^c 4	(3 ⁺) ⁺	
1403.08 ^c 17	(4 ⁺) ⁺	
1467.32@ 17	6 ⁺	
1775.0 ^c 3	(5 ⁺) ⁺	
2057.16 ^c 19	(6 ⁺) ⁺	
2218.12@ 20	8 ⁺	
2459.6 ^c 3	(7 ⁺) ⁺	
2565.4 ^g 4	(7 ⁻) ⁻	
2795.65 ^c 21	(8 ⁺) ⁺	
2873.1 4	(7 ⁻) ⁻	
3008.4 ^j 4	(8 ⁻) ⁻	
3033.8 ^g 4	(9 ⁻) ⁻	
3040.54@ 22	10 ⁺	
3216.7 ^c 6	(9 ⁺) ⁺	
3243.0 ^k 5	(9 ⁻) ⁻	
3562.1 ^j 6	(10 ⁻) ⁻	
3599.5 ^l 5	(10 ⁻) ⁻	
3608.9 ^c 4	(10 ⁺) ⁺	
3682.7 ^g 4	(11 ⁻) ⁻	
3748.2 15		Level proposed by 1997Se09, but the deexciting transitions not shown.
3820.77& 23	(12 ⁺) ⁺	
3843.5 ^k 6	(11 ⁻) ⁻	

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$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06 (continued) ^{122}Xe Levels (continued)

E(level) [†] #	J ^π [‡]	Comments
3962.1 ^c 8	(11 ⁺)	
4152.32 ^d 23	(12 ⁺)	
4239.5 ^j 7	(12 ⁻)	
4277.2 ^l 6	(12 ⁻)	
4412.3 ^c 4	(12 ⁺)	
4440.0 ^g 6	(13 ⁻)	
4515.2 11		
4564.38 ^{&} 25	(14 ⁺)	
4575.5 ^k 8	(13 ⁻)	
4715.6 ^c 10	(13 ⁺)	
4827.9 ^e 4	(12 ⁺)	J ^π : from 2003Mo27; DCO ratio for the 1007.4y indicated mult.= (Q).
5005.2 ^e 4	(13 ⁺)	
5032.0 ^j 8	(14 ⁻)	
5045.8 ^l 7	(14 ⁻)	
5059.61 ^d 24	(14 ⁺)	
5185.2 ^c 3	(14 ⁺)	
5210.2 ^g 6	(15 ⁻)	
5236.8 ^e 4	(14 ⁺)	
5407.1 ^{&} 5	(16 ⁺)	
5407.3 ^k 9	(15 ⁻)	
5531.6 ^e 4	(15 ⁺)	
5849.5 ^l 7	(16 ⁻)	
5851.3 4	(15)	
5856.0 5	(15)	
5884.9 ^e 5	(16 ⁺)	
5907.22 ^d 25	(16 ⁺)	
5916.9 ^j 9	(16 ⁻)	
6048.9 ^g 7	(17 ⁻)	
6125.5 ^f 4	(16 ⁺)	
6290.4 ^e 4	(17 ⁺)	
6303.8 ^k 10	(17 ⁻)	
6370.6 ^{&} 5	(18 ⁺)	
6536.4 ^f 4	(17 ⁺)	
6693.8 ^l 7	(18 ⁻)	
6743.6 ^e 5	(18 ⁺)	
6786.9 ^d 3	(18 ⁺)	
6865.2 ^j 10	(18 ⁻)	
6941.1 ^g 7	(19 ⁻)	
6963.1 ^f 5	(18 ⁺)	
7243.4 ^k 10	(19 ⁻)	
7388.9 ^f 4	(19 ⁺)	
7454.3 ^a 5	(20 ⁺)	
7577.9 ^l 7	(20 ⁻)	
7766.5 ^d 3	(20 ⁺)	
7806.7 ^f 5	(20 ⁺)	
7861.3 ^j 11	(20 ⁻)	
7883.9 ^g 8	(21 ⁻)	
8239.0 ^k 11	(21 ⁻)	

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$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06 (continued) ^{122}Xe Levels (continued)

E(level) [†] #	J ^π [‡]	Comments
8257.1 ^f 5	(21 ⁺)	
8512.2 ^l 8	(22 ⁻)	
8640.8 ^a 5	(22 ⁺)	
8654.3 ^b 6	(22 ⁺)	
8787.9 ^d 3	(22 ⁺)	
8802.3 ^f 7	(22 ⁺)	
8889.2 ^j 11	(22 ⁻)	
8977.4 ^g 8	(23 ⁻)	
9173.1 ^a 5	(23 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₅₊ \otimes [$\nu(\text{h}_{11/2})^4$] ₈₊ .
9304.9 ^k 12	(23 ⁻)	
9542.4 ^d 4	(24 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^4$] ₈₊ .
9594.6 ^l 9	(24 ⁻)	
9739.2 ^a 5	(24 ⁺)	
9876.4 ^b 8	(24 ⁺)	
10002.4 ^h 9	(25 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^1(\text{g}_{7/2}+\text{d}_{5/2})^3$] ₉₋ \otimes [$\nu(\text{h}_{11/2})^4$] ₁₆₊ . J ^π : (Q) γ to (23 ⁻).
10199.7 ^a 5	(25 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₅₊ \otimes [$\nu(\text{h}_{11/2})^4(\text{g}_{7/2}+\text{d}_{5/2})^{-1}(\text{s}_{1/2})^1$] ₁₀₊ .
10251.4 ⁱ 9	(25 ⁻)	
10464.9 ^k 13	(25 ⁻)	
10570.4 ^d 4	(26 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₅₊ \otimes [$\nu(\text{h}_{11/2})^4(\text{g}_{7/2}+\text{d}_{5/2})^{-1}(\text{s}_{1/2})^1$] ₁₁₊ .
10659.8 ^h 10	(27 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^5(\text{g}_{7/2}+\text{d}_{5/2})^{-1}$] ₁₁₋ .
10789.2 ^a 5	(26 ⁺)	
10820.3 ^l 10	(26 ⁻)	
10830.7 11		
10944.4 ^d 5	(28 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^4(\text{g}_{7/2}+\text{d}_{5/2})^{-1}(\text{s}_{1/2})^1$] ₁₂₊ .
11241.9 ^a 5	(27 ⁺)	
11530.7 ⁱ 10	(27 ⁻)	
11827.2 6	(29)	
11926.9 ^a 11	(28 ⁺)	
12068.7 ^h 10	(29 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^5(\text{g}_{7/2}+\text{d}_{5/2})^{-1}$] ₁₃₋ .
12070.4 ^l 11	(28 ⁻)	
12131.7 ^d 6	(30 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^4(\text{g}_{7/2}+\text{d}_{5/2})^{-2}(\text{s}_{1/2})^1(\text{d}_{3/2})^1$] ₁₄₊ .
12297.7 ⁱ 10	(29 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^5(\text{g}_{7/2}+\text{d}_{5/2})^{-1}$] ₁₃₋ .
12310.9 ^a 5	(29 ⁺)	
12444.9 ^a 15		
12649.2 ^h 10	(30 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^5(\text{g}_{7/2}+\text{d}_{5/2})^{-1}$] ₁₄₋ .
13339.4 ^h 11	(31 ⁻)	Possible admixture of non-collective state is suggested in 1994Ti01: configuration= [$\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2$] ₁₆₊ \otimes [$\nu(\text{h}_{11/2})^3(\text{d}_{3/2})^1$] ₁₅₋ .

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$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ **1994Ti01,1997Se06 (continued)** ^{122}Xe Levels (continued)

E(level) [†] #	J π [‡]	Comments
13472.7 ^d 7	(32 ⁺)	Possible admixture of non-collective state is suggested in 1994Ti01 : configuration= $[\pi(\text{h}_{11/2})^2(\text{g}_{7/2}+\text{d}_{5/2})^2]_{16+} \otimes [\nu(\text{h}_{11/2})^4]_{16+}$.

[†] E(levels) are based on a least-squares fit to the combined E(γ)'s of **1997Se06** and **1994Ti01** (evaluator).

[‡] Spin and parity values are those proposed in Adopted Levels.

Hyperdeformed band (E=1440 82 or 122, J up to in the range of 34:56) in ^{122}Xe is suggested from $^{64}\text{Ni}(^{64}\text{Ni},2n)^{126}\text{Ba}$, followed by delayed α emission (**2005Ny02**).

@ Band(A): g.s. band, (π,α)=(+,0).

& Band(B): S-band, (π,α)=(+,0); possible configuration= $\nu(7/2[523])\nu(7/2[523])$.

^a Band(C): band 1, A branch above S-band (6370 keV).

^b Band(D): band 2, B branch above S-band (6370 keV).

^c Band(E): quasi- γ band $\Delta J=1$ band.

^d Band(F): band 3, (π,α)=(+,0); possible configuration= $\pi(1/2[550])\pi(1/2[550]) \nu(7/2[523])\nu(5/2[532])\nu(7/2[523])\nu(5/2[532])$.

^e Band(G): band 4, $\Delta J=1$ band; **1994Ti01** and **1997Se06** assumed $\pi=-$, but it was changed to $\pi=+$ in accordance with **2003Mo27** on the basis of Q transitions connecting to g.s. band and γ band.

^f Band(H): band 5, non-collective high-spin state, $\pi=+$.

^g Band(I): band 6, (π,α)=(-,-1) possible configuration= $\pi(1/2[550])\pi(5/2[422])\nu(7/2[523])\nu(1/2[532])$.

^h Band(J): band 7, A branch above band 6 (8977 keV).

ⁱ Band(K): band 8, B branch above band 6 (8977 keV).

^j Band(L): band 9, (π,α)=(-,0); possible configuration= $\nu(7/2[523])\nu(5/2[402])\pi(1/2[550])\pi(1/2[550])$.

^k Band(M): band 10, (π,α)=(-,-1); possible configuration= $\pi(7/2[523])\nu(5/2[402])\pi(1/2[550])\pi(1/2[550])$.

^l Band(N): band 11, (π,α)=(-,0) possible configuration= $\pi(1/2[550])\pi(3/2[422])\nu(7/2[523])\nu(7/2[523])$.

 $\gamma(^{122}\text{Xe})$

$E_i(\text{level})$	J π_i	E_γ [†]	I_γ [‡]	E_f	J π_f	Mult.#	Comments
331.30	2 ⁺	331.3 [@] 1	100 5	0.0	0 ⁺	E2 ^{&}	$E_\gamma=331.1$ 4, $I_\gamma=100$ (1994Ti01).
828.70	4 ⁺	497.4 [@] 1	97 7	331.30	2 ⁺	E2	$E_\gamma=497.3$ 4, $I_\gamma=98$ 6 (1994Ti01), Mult.: DCO=1.22 3 (1994Ti01), DCO=0.97 3 (1997Se06); RUL from T _{1/2} (level) (Adopted Levels).
843.20	(2 ⁺)	511.9 [@] 1	10.6 9	331.30	2 ⁺		
		843.2 ^b 5	17 5	0.0	0 ⁺		$E_\gamma=843.2$ 5, but I_γ was not given (1997Se06).
1214.6	(3) ⁺	371.4 ^a 5		843.20	(2 ⁺)		
		883.3 ^a 5		331.30	2 ⁺		
1403.08	(4) ⁺	559.8 [@] 5	<3	843.20	(2 ⁺)		
		574.4 [@] 1	5.2 7	828.70	4 ⁺		
1467.32	6 ⁺	638.6 [@] 1	94 4	828.70	4 ⁺	E2	$E_\gamma=638.4$ 4, $I_\gamma=95$ 5 (1994Ti01), Mult.: DCO=1.20 4 (1994Ti01), DCO=0.90 4 (1997Se06); RUL from T _{1/2} (level) (Adopted Levels).
1775.0	(5) ⁺	372.0 ^a 5		1403.08	(4) ⁺		
		560.4 [@] 5	<3	1214.6	(3) ⁺		
		946.3 [@] 3	3.5 4	828.70	4 ⁺		
2057.16	(6) ⁺	589.8 [@] 5	<2.7	1467.32	6 ⁺		
		654.1 [@] 1	5.4 2	1403.08	(4) ⁺	Q	Mult.: DCO \approx 1 (1997Se06).
2218.12	8 ⁺	750.8 [@] 1	80 3	1467.32	6 ⁺	E2	$E_\gamma=750.5$ 4, $I_\gamma=79$ 3 (1994Ti01).

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$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ **1994Ti01,1997Se06 (continued)** $\gamma(^{122}\text{Xe})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult.#	Comments
							Mult.: DCO=1.05 1 (1994Ti01), DCO=0.94 6 (1997Se06), RUL from T _{1/2} (level) (Adopted Levels).
2459.6	(7) ⁺	684.6 [@] 1	9.7 8	1775.0	(5) ⁺	Q	Mult.: DCO=0.87 13 (1997Se06),
2565.4	(7) ⁻	1097.9 ^b 4	7.1 18	1467.32	6 ⁺	E1&	
2795.65	(8) ⁺	738.5 [@] 1	7.8 4	2057.16	(6) ⁺		
2873.1	(7) ⁻	1405.7 ^b 4	≈1	1467.32	6 ⁺	E1&	
3008.4	(8) ⁻	135.2 ^b 4	1.1 4	2873.1	(7) ⁻	D	Mult.: DCO=0.35 21 (1994Ti01).
		790.3 ^b 4	≈1	2218.12	8 ⁺		
3033.8	(9) ⁻	468.3 ^b 4	7.6 13	2565.4	(7) ⁻	E2	Mult.: DCO=0.96 4 (1994Ti01); RUL from T _{1/2} (level) (Adopted Levels).
		815.8 ^b 4	31.1 4	2218.12	8 ⁺	E1+M2&	Mult.: DCO=0.58 2 (1994Ti01).
3040.54	10 ⁺	822.4 [@] 1	40.6 17	2218.12	8 ⁺	E2	E _γ =822.3 4, I _γ =42.2 19 (1994Ti01). Mult.: DCO=1.05 2 (1994Ti01), DCO=0.98 2 (1997Se06); RUL from T _{1/2} (level) (Adopted Levels).
3216.7	(9) ⁺	757.1 ^a 5		2459.6	(7) ⁺		
3243.0	(9) ⁻	1024.9 ^c 4		2218.12	8 ⁺	E1&	
3562.1	(10) ⁻	553.7 ^b 4	≈3	3008.4	(8) ⁻	Q	Mult.: DCO=1.11 7 (1994Ti01).
3599.5	(10) ⁻	565.9 ^b 4	7.7 6	3033.8	(9) ⁻	(D)	Mult.: DCO=0.44 4 (1994Ti01).
3608.9	(10) ⁺	813.4 [@] 3	3.7 3	2795.65	(8) ⁺		
3682.7	(11) ⁻	642.2 ^b 4	7.4 16	3040.54	10 ⁺		
		648.7 ^b 4	31.9 11	3033.8	(9) ⁻	E2	Mult.: DCO=1.02 2 (1994Ti01); RUL from T _{1/2} (level) (Adopted Levels).
3820.77	(12) ⁺	780.2 [@] 1	24.0 11	3040.54	10 ⁺	Q	E _γ =780.1 4, I _γ =21.5 3 (1994Ti01). Mult.: DCO=1.05 3 (1994Ti01), DCO=0.95 4 (1997Se06).
3843.5	(11) ⁻	600.5 ^b 4	2.9 6	3243.0	(9) ⁻	(Q)	Mult.: DCO=0.81 6 (1994Ti01).
3962.1	(11) ⁺	745.4 ^a 5		3216.7	(9) ⁺		
4152.32	(12) ⁺	1111.8 [@] 1	5.4 5	3040.54	10 ⁺	Q	E _γ =1111.5 4, I _γ =7.1 2 (1994Ti01). Mult.: DCO=1.31 13 (1994Ti01), DCO=1.00 17 (1997Se06).
4239.5	(12) ⁻	677.4 ^b 4	≈3	3562.1	(10) ⁻		
4277.2	(12) ⁻	677.9 ^b 4	7.7 7	3599.5	(10) ⁻	(Q)	Mult.: DCO=0.95 5 (1994Ti01).
4412.3	(12) ⁺	803.5 [@] 3	3.5 5	3608.9	(10) ⁺	Q	Mult.: DCO=1.01 7 (1997Se06).
4440.0	(13) ⁻	757.1 ^b 4	30.7 10	3682.7	(11) ⁻	E2	Mult.: DCO=0.99 2 (1994Ti01); RUL from T _{1/2} (level) (Adopted Levels).
4515.2		767 ^a 1		3748.2			
4564.38	(14) ⁺	743.6 [@] 1	18.4 8	3820.77	(12) ⁺	Q	E _γ =743.5 4, I _γ =18.4 22 (1994Ti01). Mult.: DCO=1.13 3 (1994Ti01), DCO=1.08 11 (1997Se06).
4575.5	(13) ⁻	732.0 ^b 4	5.7 3	3843.5	(11) ⁻	Q	Mult.: DCO=1.23 8 (1994Ti01).
4715.6	(13) ⁺	753.5 ^a 5		3962.1	(11) ⁺		
4827.9	(12) ⁺	675.6 ^a 5		4152.32	(12) ⁺		
		1007.2 [@] 3	2.6 3	3820.77	(12) ⁺	Q	Mult.: DCO=1.13 3 (1994Ti01), DCO=1.08 11 (1997Se06).
5005.2	(13) ⁺	177.3 [@] 1	4.4 3	4827.9	(12) ⁺	D(+Q)	Mult.: DCO=0.41 5 (1997Se06).
5032.0	(14) ⁻	792.5 ^b 4	≈2	4239.5	(12) ⁻		
5045.8	(14) ⁻	768.7 ^b 4	7.6 7	4277.2	(12) ⁻		
5059.61	(14) ⁺	907.3 [@] 1	5.9 4	4152.32	(12) ⁺		E _γ =907.3 2, I _γ =6.4 3 (1994Ti01). DCO=0.88 9 (1994Ti01), DCO=0.66 15 (1997Se06).

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$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ **1994Ti01,1997Se06 (continued)** $\gamma(^{122}\text{Xe})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. #	Comments
5059.61	(14 ⁺)	1238.8 [@] 1	5.2 3	3820.77	(12 ⁺)	(Q)	$E_\gamma=1238.7$ 2, $I_\gamma=6.0$ 3 (1994Ti01). Mult.: DCO=0.93 20 (1994Ti01), DCO=0.95 7 (1997Se06).
5185.2	(14 ⁺)	670 [@] 1 773.0 [@] 3	1.5 1 3.2 2	4515.2 4412.3	(12 ⁺)		
5210.2	(15 ⁻)	770.0 ^b 4	28.8 20	4440.0	(13 ⁻)	Q	Mult.: DCO=1.13 2 (1994Ti01).
5236.8	(14 ⁺)	231.6 [@] 1	5.3 5	5005.2	(13 ⁺)	D(+Q)	Mult.: DCO=0.29 5 (1997Se06).
5407.1	(16 ⁺)	842.6 ^a 4	17 5	4564.38	(14 ⁺)	Q	I_γ from 1994Ti01; $E_\gamma=843.2$ 4. Mult.: DCO=0.94 3 (1994Ti01), DCO=0.97 5, (1997Se06).
5407.3	(15 ⁻)	831.8 ^b 4	≈ 4	4575.5	(13 ⁻)		
5531.6	(15 ⁺)	294.8 [@] 1	3.0 2	5236.8	(14 ⁺)	D(+Q)	Mult.: DCO=0.25 3 (1997Se06).
5849.5	(16 ⁻)	803.9 ^b 4	7.5 3	5045.8	(14 ⁻)	Q	Mult.: DCO=1.08 7 (1994Ti01).
5851.3	(15)	614.5 [@] 2	3.9 2	5236.8	(14 ⁺)	D(+Q)	Mult.: DCO=0.51 10 (1997Se06).
5856.0	(15)	619.1 [@] 3	2.9 2	5236.8	(14 ⁺)		
5884.9	(16 ⁺)	353.3 [@] 5 648.1 ^a 5	<3.9	5531.6 5236.8	(15 ⁺) (14 ⁺)	D(+Q)	Mult.: DCO=0.37 7 (1997Se06).
5907.22	(16 ⁺)	722.1 [@] 2 847.6 [@] 1	4.7 4 14.4 6	5185.2 5059.61	(14 ⁺) (14 ⁺)	Q	Mult.: DCO=1.00 5 (1997Se06). $E_\gamma=847.6$ 3, $I_\gamma=10.2$ 3 (1994Ti01). Mult.: DCO=0.61 5 (1997Se06).
		1342.8 [@] 5	1.2 3	4564.38	(14 ⁺)	(Q)	$E_\gamma=1342.3$ 4, $I_\gamma=7.6$ 3 (1994Ti01). Mult.: DCO=1.42 10 (1994Ti01).
5916.9	(16 ⁻)	884.9 ^b 4	≈ 3	5032.0	(14 ⁻)		
6048.9	(17 ⁻)	838.5 ^b 4	29.2 12	5210.2	(15 ⁻)	Q	Mult.: DCO=1.09 2 (1994Ti01).
6125.5	(16 ⁺)	269.5 [@] 5 274.2 [@] 1	2.2 2 5.2 2	5856.0 5851.3	(15) (15)	D(+Q) D(+Q)	Mult.: DCO=0.40 12 (1997Se06). Mult.: DCO=0.44 6 (1997Se06).
6290.4	(17 ⁺)	405.5 [@] 2 758.8 ^a 2	2.6 2	5884.9 5531.6	(16 ⁺) (15 ⁺)	D(+Q)	Mult.: DCO=0.49 12 (1997Se06).
6303.8	(17 ⁻)	896.5 ^b 4	≈ 4	5407.3	(15 ⁻)		
6370.6	(18 ⁺)	963.5 [@] 1	7.5 6	5407.1	(16 ⁺)	Q	$E_\gamma=963.9$ 4, $I_\gamma=9.6$ 4 (1994Ti01). Mult.: DCO=1.16 8 (1994Ti01), DCO=0.96 8 (1997Se06).
6536.4	(17 ⁺)	410.9 [@] 1	6.7 3	6125.5	(16 ⁺)	D(+Q)	Mult.: DCO=0.40 4 (1997Se06).
6693.8	(18 ⁻)	644.6 ^b 4 844.5 ^c 4	6.5 20	6048.9 5849.5	(17 ⁻) (16 ⁻)		
6743.6	(18 ⁺)	453.2 [@] 5 858.7 ^a 1	<4.2	6290.4 5884.9	(17 ⁺) (16 ⁺)		
6786.9	(18 ⁺)	879.7 [@] 1	10.7 5	5907.22	(16 ⁺)	Q	$E_\gamma=879.6$ 4, $I_\gamma=12.6$ 15 (1994Ti01). Mult.: DCO=1.24 9 (1994Ti01), DCO=1.05 10 (1997Se06). DCO=0.88 43 (1994Ti01).
6865.2	(18 ⁻)	948.3 ^b 4	2.9 4	5916.9	(16 ⁻)		
6941.1	(19 ⁻)	246.9 ^b 4 892.3 ^b 4	4.5 2 27.4 9	6693.8 6048.9	(18 ⁻) (17 ⁻)	D(+Q) Q	Mult.: DCO=0.76 9 (1994Ti01). Mult.: DCO=1.16 3 (1994Ti01).
6963.1	(18 ⁺)	426.6 [@] 5 837.5 ^a 5	<3	6536.4 6125.5	(17 ⁺) (16 ⁺)		
7243.4	(19 ⁻)	939.6 ^b 4	≈ 4	6303.8	(17 ⁻)		
7388.9	(19 ⁺)	425.6 [@] 5 852.5 [@] 2	<4 5.5 5	6963.1 6536.4	(18 ⁺) (17 ⁺)		
7454.3	(20 ⁺)	1083.7 [@] 1	6.1 5	6370.6	(18 ⁺)	Q	Mult.: DCO=1.16 27 (1997Se06). $E_\gamma=1083.5$ 4 $I_\gamma=8.0$ 4 (1994Ti01). Mult.: DCO=1.08 4 (1994Ti01), DCO=0.73 11 (1997Se06).
7577.9	(20 ⁻)	636.4 ^c 4		6941.1	(19 ⁻)		

Continued on next page (footnotes at end of table)

$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ **1994Ti01,1997Se06 (continued)** $\gamma(^{122}\text{Xe})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. #	Comments
7577.9	(20 ⁻)	884.3 ^b 4	13.9 12	6693.8	(18 ⁻)	(Q)	Mult.: DCO=0.88 10 (1994Ti01).
7766.5	(20 ⁺)	979.6 [@] 1	8.7 4	6786.9	(18 ⁺)	Q	E γ =979.8 5, I γ =14.1 5 (1994Ti01). Mult.: DCO=1.07 5 (1994Ti01).
7806.7	(20 ⁺)	843.4 ^a 5 1020 ^a 1		6963.1	(18 ⁺)		
				6786.9	(18 ⁺)		
7861.3	(20 ⁻)	996.1 ^b 4	\approx 3	6865.2	(18 ⁻)		
7883.9	(21 ⁻)	305.8 ^b 4 943.0 ^b 4	3.3 2 25.1 7	7577.9	(20 ⁻)	D(+Q)	Mult.: DCO=0.55 30 (1994Ti01).
				6941.1	(19 ⁻)	Q	Mult.: DCO=1.17 3 (1994Ti01).
8239.0	(21 ⁻)	995.6 ^b 4	\approx 4	7243.4	(19 ⁻)	(Q)	Mult.: DCO=0.98 11 (1994Ti01).
8257.1	(21 ⁺)	450.4 [@] 1 868.3 [@] 3	5.5 4 3.4 5	7806.7	(20 ⁺)	D(+Q)	Mult.: DCO=0.41 6 (1997Se06).
				7388.9	(19 ⁺)	(Q)	Mult.: DCO=1.13 27 (1997Se06).
8512.2	(22 ⁻)	628.2 ^b 4 934.3 ^b 4	1.4 1 9.2 5	7883.9	(21 ⁻)	D(+Q)	Mult.: DCO=0.46 7 (1994Ti01).
				7577.9	(20 ⁻)	Q	Mult.: DCO=1.24 8 (1994Ti01).
8640.8	(22 ⁺)	834.1 [@] 1 1186.4 [@] 4	11.7 5 \leq 4.0	7806.7	(20 ⁺)	(Q)	Mult.: DCO=1.12 27 (1997Se06).
				7454.3	(20 ⁺)	Q	E γ =1187.3 4, I γ =7.6 2 (1994Ti01). Mult.: DCO=1.00 9 (1994Ti01), DCO=1.04 28 (1997Se06).
8654.3	(22 ⁺)	1200.0 [@] 3	2.0 3	7454.3	(20 ⁺)	Q	E γ =1199.3 4, I γ =5.5 2 (1994Ti01). Mult.: DCO=1.18 8 (1994Ti01).
8787.9	(22 ⁺)	1021.4 [@] 1	7.5 4	7766.5	(20 ⁺)	Q	E γ =1021.2 4, I γ =10.7 8 (1994Ti01). Mult.: DCO=1.26 15 (1994Ti01).
8802.3	(22 ⁺)	545.2 [@] 5	2.2 2	8257.1	(21 ⁺)	D(+Q)	Mult.: DCO=0.43 6 (1997Se06).
8889.2	(22 ⁻)	1027.9 ^b 3	\approx 1	7861.3	(20 ⁻)		
8977.4	(23 ⁻)	465.1 ^b 4 1093.6 ^b 4	4.8 8 23.7 8	8512.2	(22 ⁻)	D(+Q)	Mult.: DCO=0.55 11 (1994Ti01).
				7883.9	(21 ⁻)	Q	Mult.: DCO=1.12 4 (1994Ti01).
9173.1	(23 ⁺)	532.3 [@] 1 915.9 [@] 3	9.3 6 3.0 4	8640.8	(22 ⁺)	D(+Q)	E γ =532.1 4, I γ =8.9 5 (1994Ti01). Mult.: DCO=0.43 4 (1994Ti01), DCO=0.27 4 (1997Se06).
				8257.1	(21 ⁺)		
9304.9	(23 ⁻)	1065.9 ^b 4	4.4 6	8239.0	(21 ⁻)	(Q)	Mult.: DCO=0.91 15 (1994Ti01).
9542.4	(24 ⁺)	754.5 [@] 1	6.5 7	8787.9	(22 ⁺)	Q	E γ =754.5 4, I γ \approx 9 (1994Ti01). Mult.: DCO=0.95 14 (1994Ti01).
9594.6	(24 ⁻)	1082.4 ^b 4	4.4 6	8512.2	(22 ⁻)	Q	Mult.: DCO=1.11 9 (1994Ti01).
9739.2	(24 ⁺)	566.1 [@] 2	6 1	9173.1	(23 ⁺)	D(+Q)	E γ =564.7 5, but I γ was not given (1994Ti01). Mult.: DCO=0.50 6 (1997Se06).
9876.4	(24 ⁺)	1222.1 ^a 5		8654.3	(22 ⁺)	(Q)	E γ =1224.9 10, I γ =2.0 3 from 1994Ti01. Mult.: DCO=0.98 22 (1994Ti01).
10002.4	(25 ⁻)	1025.0 ^b 4	16.2 9	8977.4	(23 ⁻)	Q	Mult.: DCO=1.07 4 (1994Ti01).
10199.7	(25 ⁺)	460.5 [@] 2 1026.7 [@] 2	3.3 1 5.8 12	9739.2	(24 ⁺)	D(+Q)	Mult.: DCO=0.40 11 (1997Se06).
				9173.1	(23 ⁺)		E γ =1027.6 5, I γ =7.9 10 (1994Ti01).
10251.4	(25 ⁻)	1274.1 ^b 4	6.9 15	8977.4	(23 ⁻)	Q	Mult.: DCO=1.04 7 (1994Ti01).
10464.9	(25 ⁻)	1159.9 ^b 4	3.2 2	9304.9	(23 ⁻)		DCO=1.62 18 (1994Ti01).
10570.4	(26 ⁺)	1028.0 [@] 2	5.2 4	9542.4	(24 ⁺)		E γ =1028.2 4, I γ \approx 8 (1994Ti01). DCO=0.88 29 (1994Ti01).
10659.8	(27 ⁻)	657.3 ^b 4	15.4 8	10002.4	(25 ⁻)	Q	Mult.: DCO=0.98 3 (1994Ti01).
10789.2	(26 ⁺)	589.3 [@] 5 1050.0 [@] 2	2.7 2 3.3 2	10199.7	(25 ⁺)		
				9739.2	(24 ⁺)		
10820.3	(26 ⁻)	1225.7 ^b 4	2.8 5	9594.6	(24 ⁻)		DCO=1.45 15 (1994Ti01).
10830.7		631 ^a 1		10199.7	(25 ⁺)		

Continued on next page (footnotes at end of table)

$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ **1994Ti01,1997Se06 (continued)** $\gamma(^{122}\text{Xe})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult.#	Comments
10944.4	(28 ⁺)	374.0 [@] 2	4.9 4	10570.4	(26 ⁺)	Q	$E_\gamma=373.6$ 4, $I_\gamma=7.5$ 6 (1994Ti01). Mult.: DCO=1.02 11 (1994Ti01), DCO=1.19 5 (1997Se06).
11241.9	(27 ⁺)	452.8 [@] 5 1042.1 [@] 1	<4.2 5.6 3	10789.2 (26 ⁺) 10199.7 (25 ⁺)			
11530.7	(27 ⁻)	1279.3 ^b 4	5.4 10	10251.4 (25 ⁻)	Q	Mult.: DCO=0.95 8 (1994Ti01).	
11827.2	(29)	882.7 [@] 5	1.8 1	10944.4 (28 ⁺)			
11926.9	(28 ⁺)	685 ^a 1		11241.9 (27 ⁺)			
12068.7	(29 ⁻)	1408.8 ^b 4	14.0 4	10659.8 (27 ⁻)	Q	Mult.: DCO=1.18 5 (1994Ti01).	
12070.4	(28 ⁻)	1250.1 ^b 4	1.6 6	10820.3 (26 ⁻)	Q	Mult.: DCO=1.21 17 (1994Ti01).	
12131.7	(30 ⁺)	304.5 [@] 4 1187.3 [@] 5	1.3 2 ≤ 4.0	11827.2 (29) 10944.4 (28 ⁺)	Q	$E_\gamma=304.1$, $I_\gamma=3.8$ 2 (1994Ti01). Mult.: DCO=1.17 18 (1997Se06). $E_\gamma=1187.6$ 4, $I_\gamma\approx 5$ (1994Ti01). Mult.: DCO=1.17 18 (1997Se06).	
12297.7	(29 ⁻)	228.8 ^b 4 767.1 ^b 4	2.3 5 4.5 10	12068.7 (29 ⁻) 11530.7 (27 ⁻)	(D)	Mult.: DCO=0.48 12 (1994Ti01).	
12310.9	(29 ⁺)	1069.0 [@] 1	5.1 3	11241.9 (27 ⁺)		DCO=0.76 16 (1997Se06).	
12444.9		518 ^a 1		11926.9 (28 ⁺)			
12649.2	(30 ⁻)	351.4 ^b 4 580.7 ^b 4	4.4 2 8.7 2	12297.7 (29 ⁻) 12068.7 (29 ⁻)	D(+Q)	Mult.: DCO=0.55 4 (1994Ti01). Mult.: DCO=0.61 5 (1994Ti01).	
13339.4	(31 ⁻)	690.2 ^b 4	7.5 3	12649.2 (30 ⁻)	D(+Q)	Mult.: DCO=0.52 6 (1994Ti01).	
13472.7	(32 ⁺)	1341.0 [@] 4	3.9 3	12131.7 (30 ⁺)			

[†] From either 1997Se06 or 1994Ti01 as given in comments. Evaluator notes that the energy values in 1994Ti01 are systematically shifted by +0.3 keV compared with the energy values in 1997Se06, and other energy values in ($^3\text{He},3n\gamma$), ($\alpha,4n\gamma$) reactions and in ^{122}Cs ε decay, thus in this dataset, evaluator reduced the E_γ by 0.3 keV from the tabulated values in 1994Ti01. $\Delta E_\gamma=0.2$ keV quoted in 1994Ti01 are also increased to 0.4 keV in this dataset.

[‡] Relative to $I(331.2\gamma)=100$ from either 1994Ti01 or 1997Se06 as given in comments. Also see $^{122}\text{Te}(\alpha,4n\gamma)$ for the relative I_γ (for G.S. band members).

From DCO ratios by 1994Ti01 and 1997Se06: DCO ratio ≈ 1 for stretched Q transition and DCO ratio ≈ 0.5 for stretched D transition. Supplemental information from $\gamma(\theta)$ in $^{122}\text{Te}(\alpha,4n\gamma)$ (1983Ku04), and $\alpha(\text{K})\text{exp}$ values in $^{122}\text{Te}(\alpha,4n\gamma)$, $^{110}\text{Pd}(\alpha,4n\gamma)$ (1982Ha44,1987Ha03).

@ Both E_γ and I_γ from 1997Se06.

& From adopted gammas.

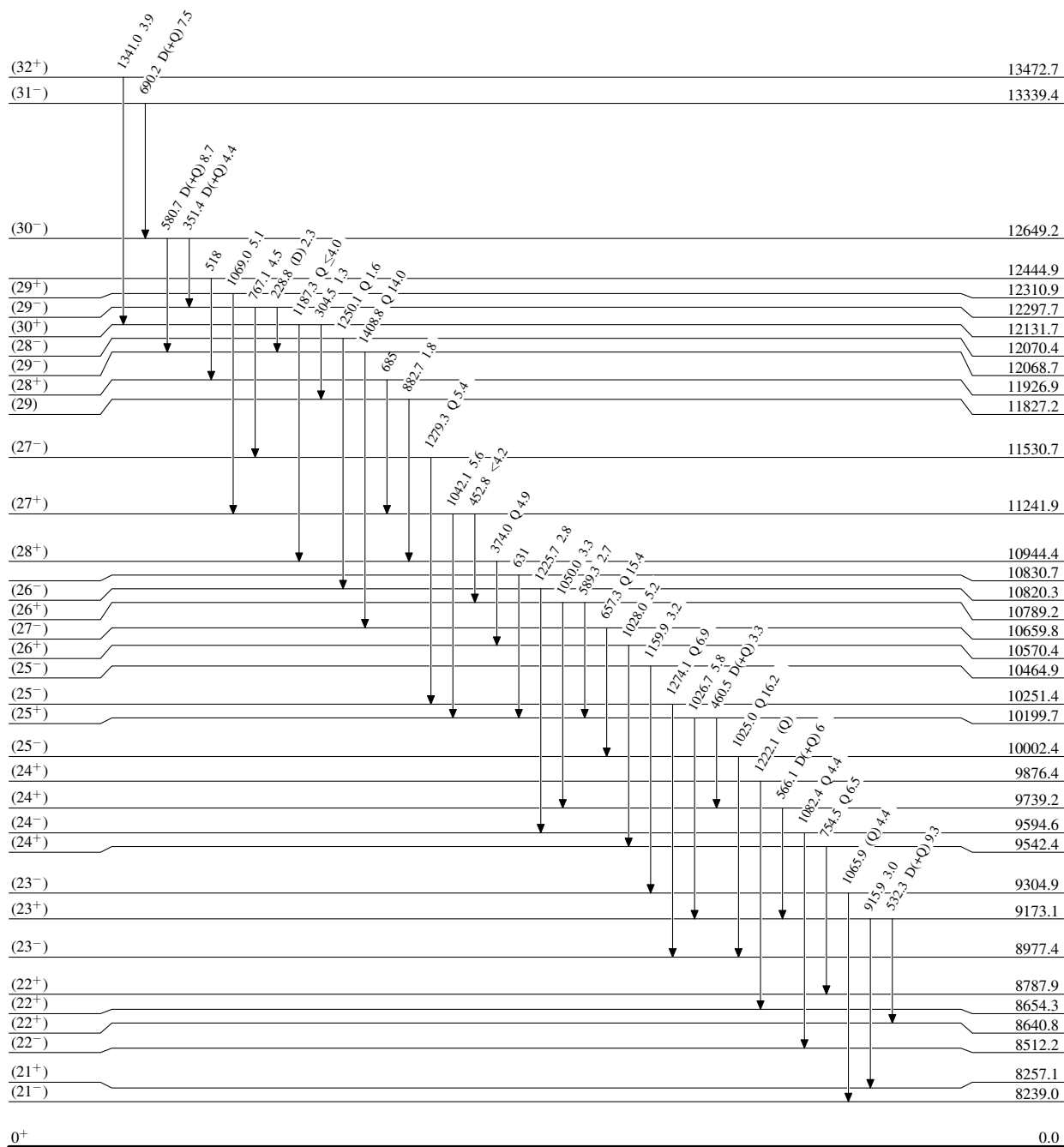
^a E_γ from 1997Se06, but I_γ was not given in 1997Se06.

^b Both E_γ and I_γ from 1994Ti01.

^c E_γ from 1994Ti01, but I_γ was not given in 1994Ti01.

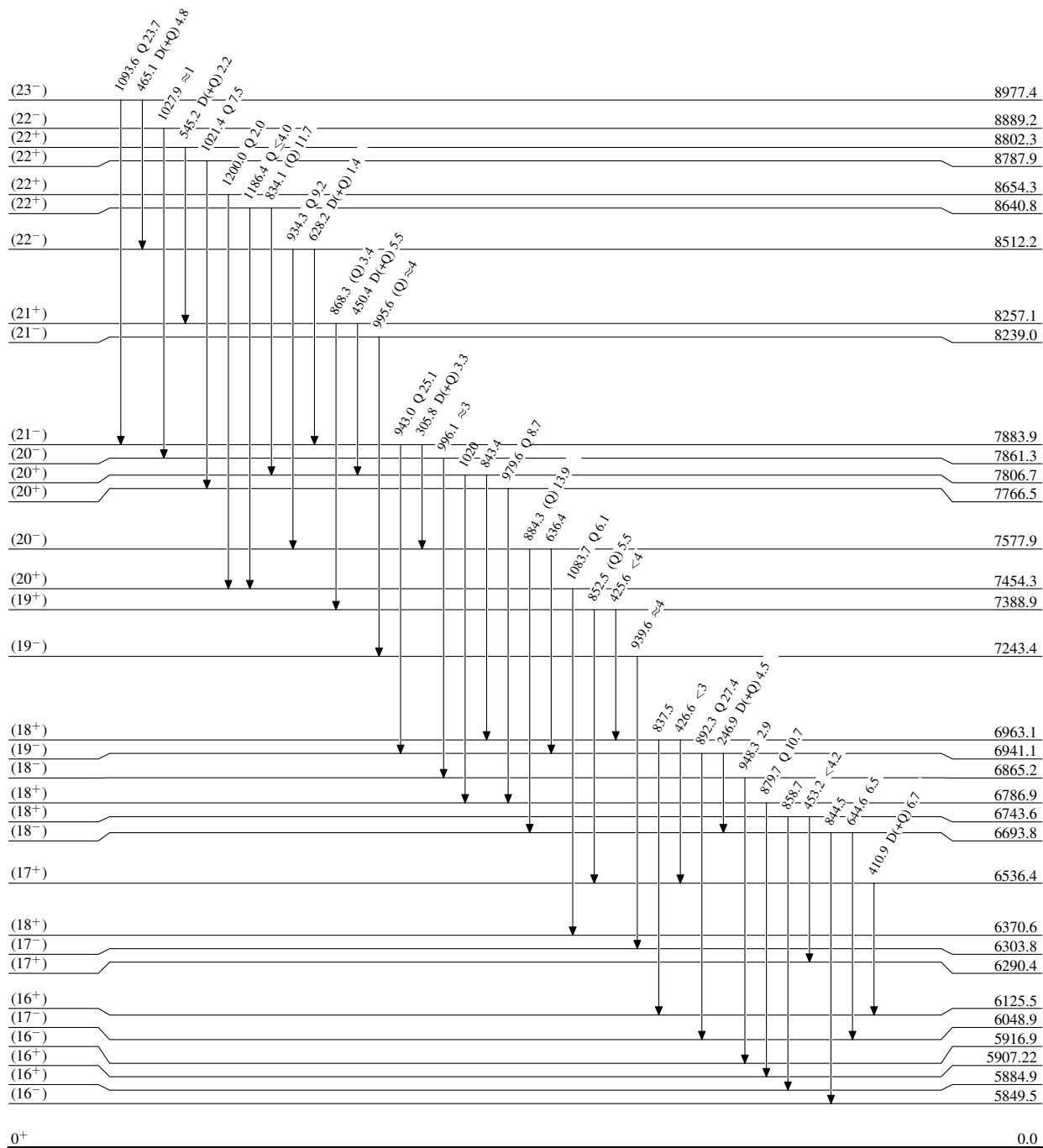
$^{96}\text{Zr}^{(30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06

Level Scheme

Intensities: relative I(γ)

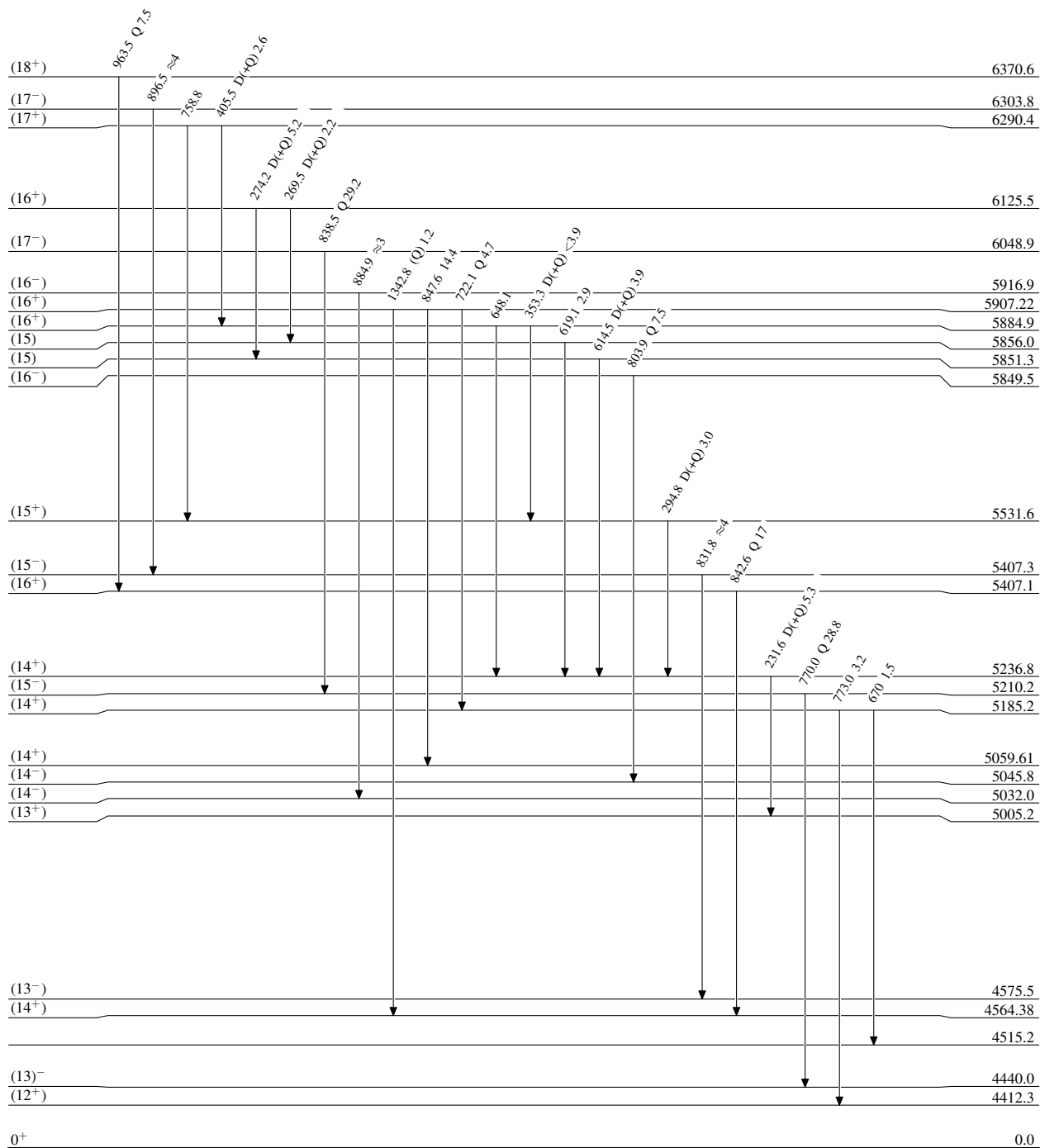
$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06

Level Scheme (continued)

Intensities: relative I(γ)

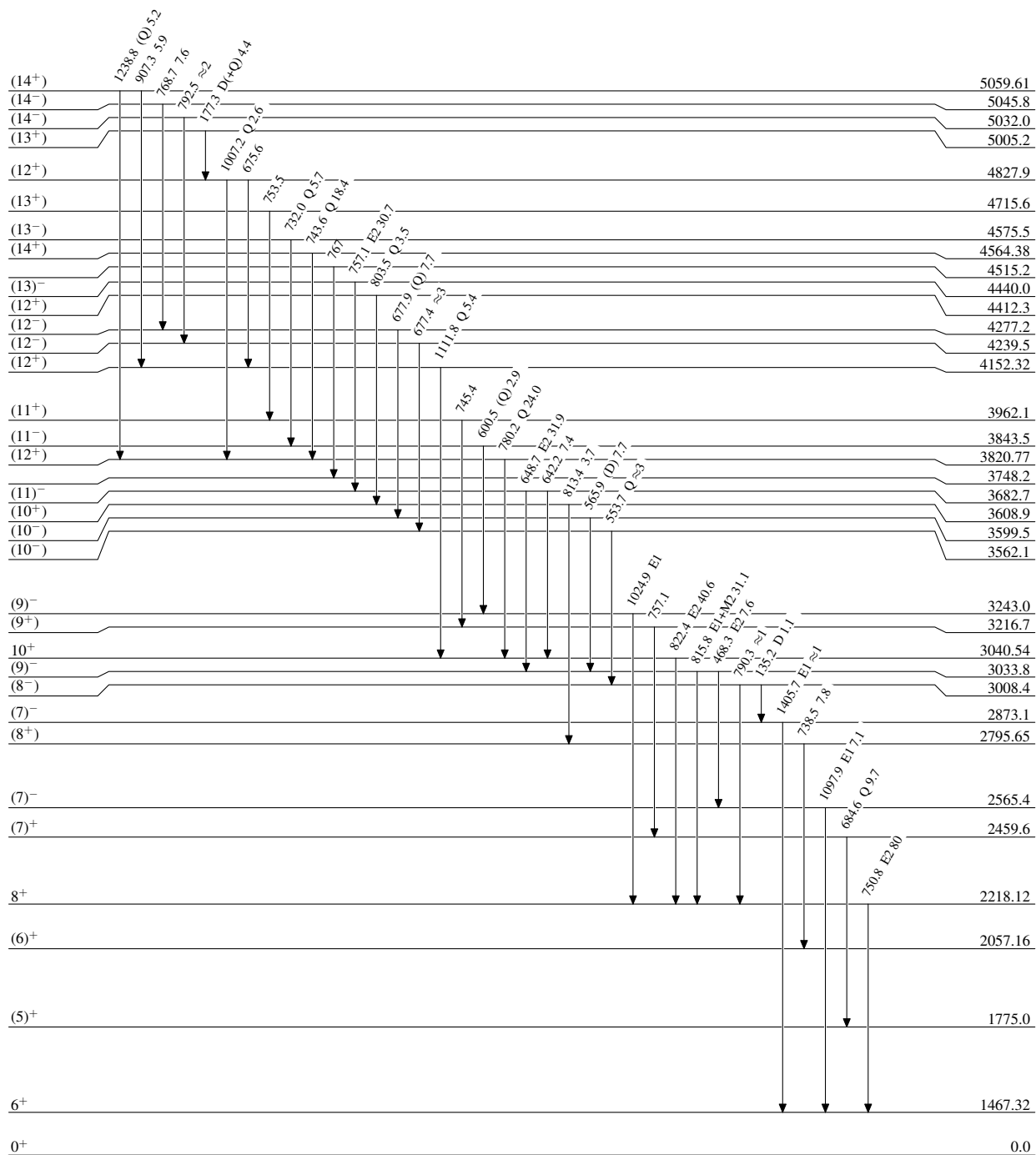
$^{96}\text{Zr}(\text{}^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06

Level Scheme (continued)

Intensities: relative I(γ)

$^{96}\text{Zr}(\text{}^{30}\text{Si}, 4n\gamma)$ 1994Ti01,1997Se06

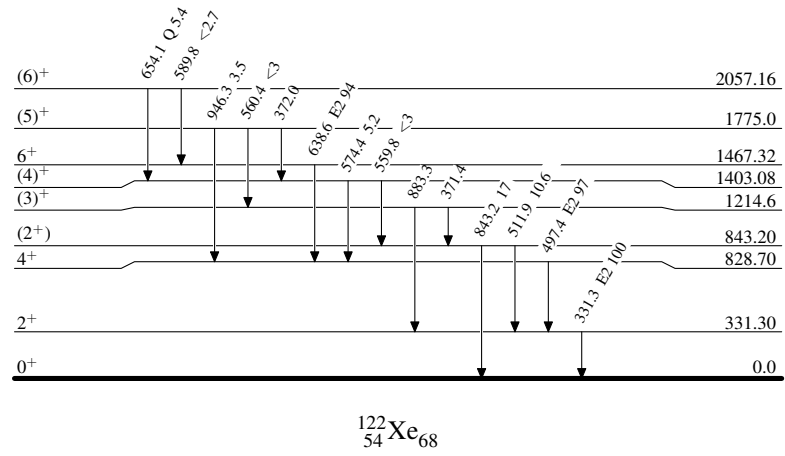
Level Scheme (continued)

Intensities: relative I(γ)

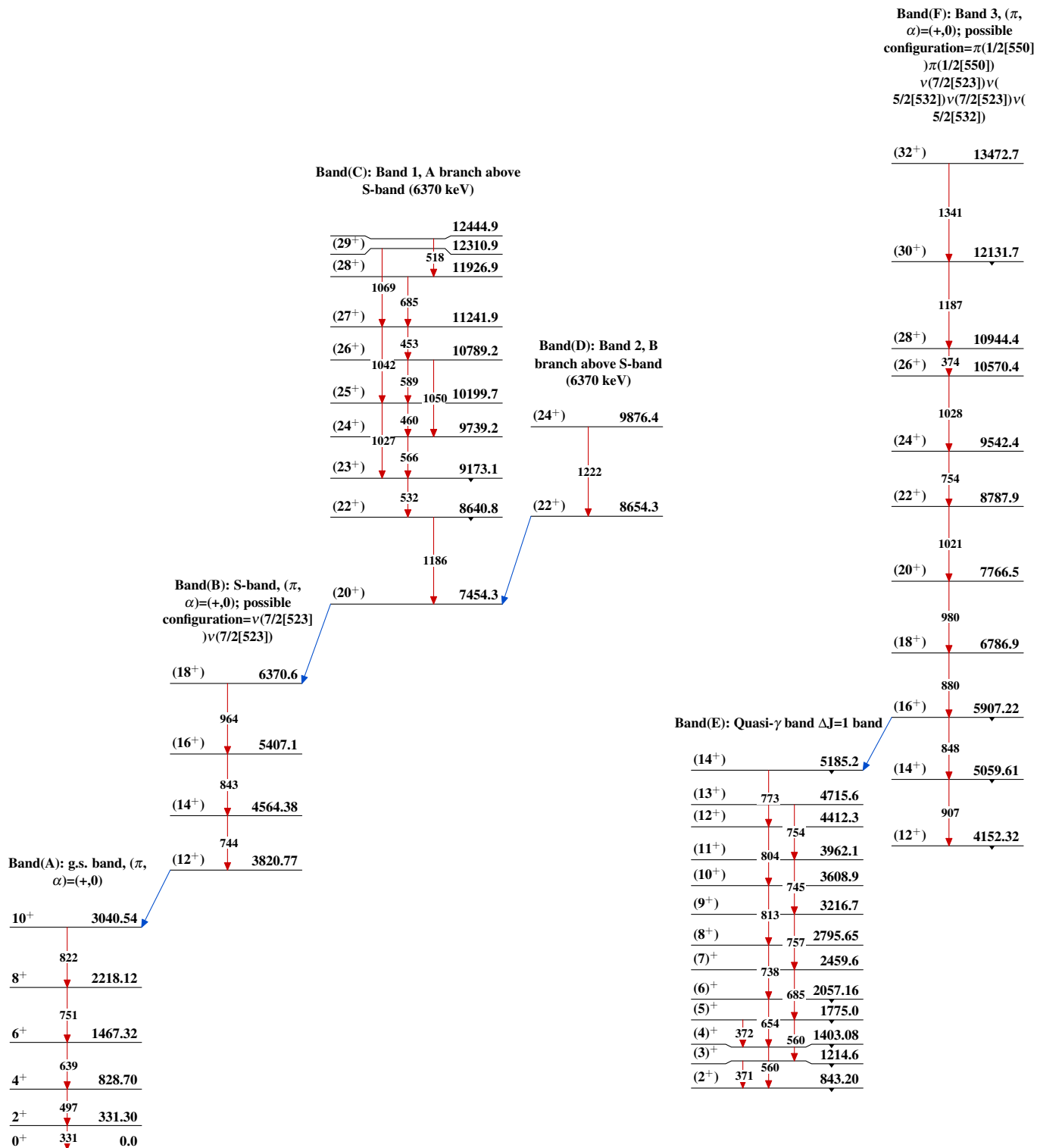
$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06

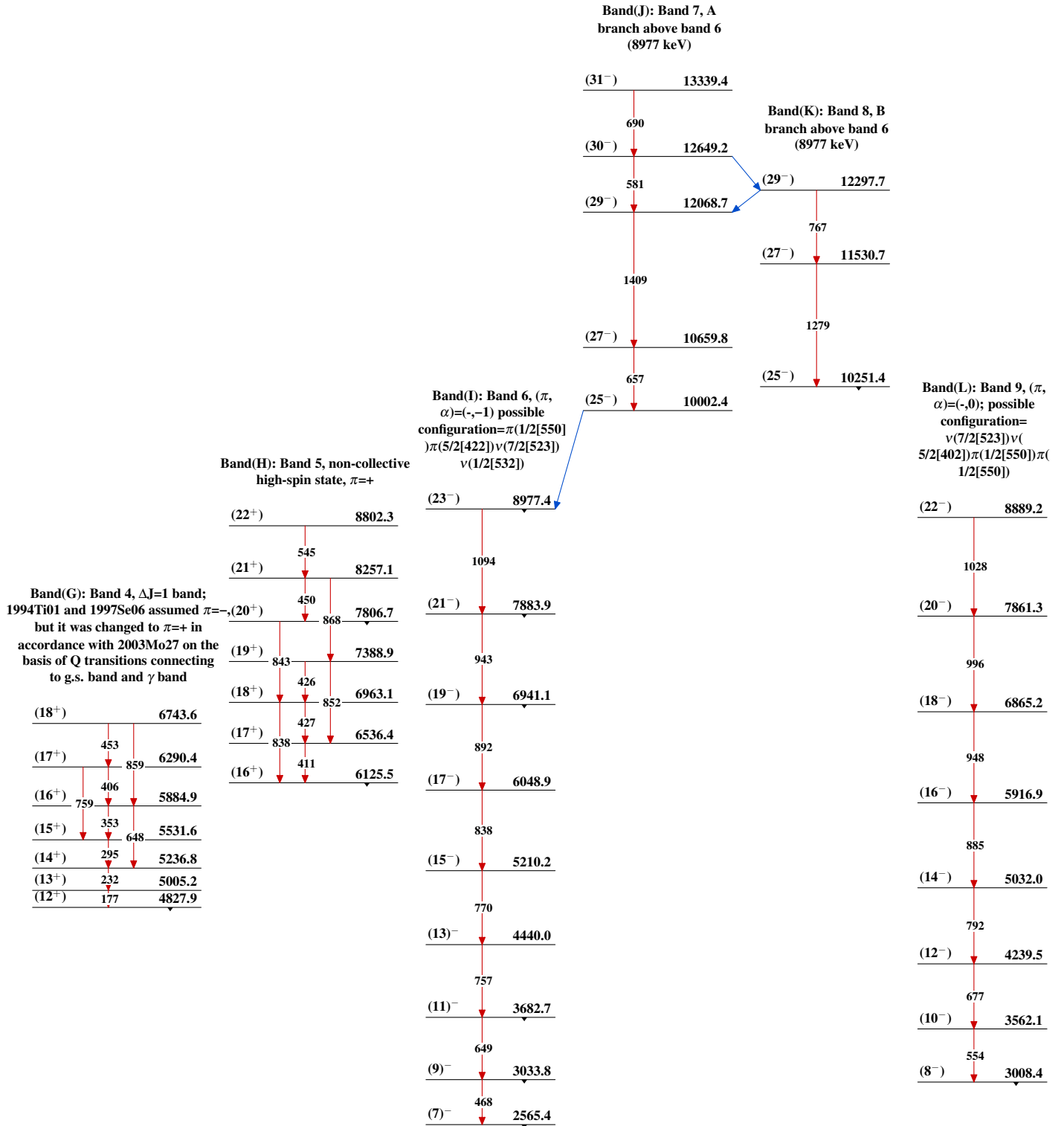
Level Scheme (continued)

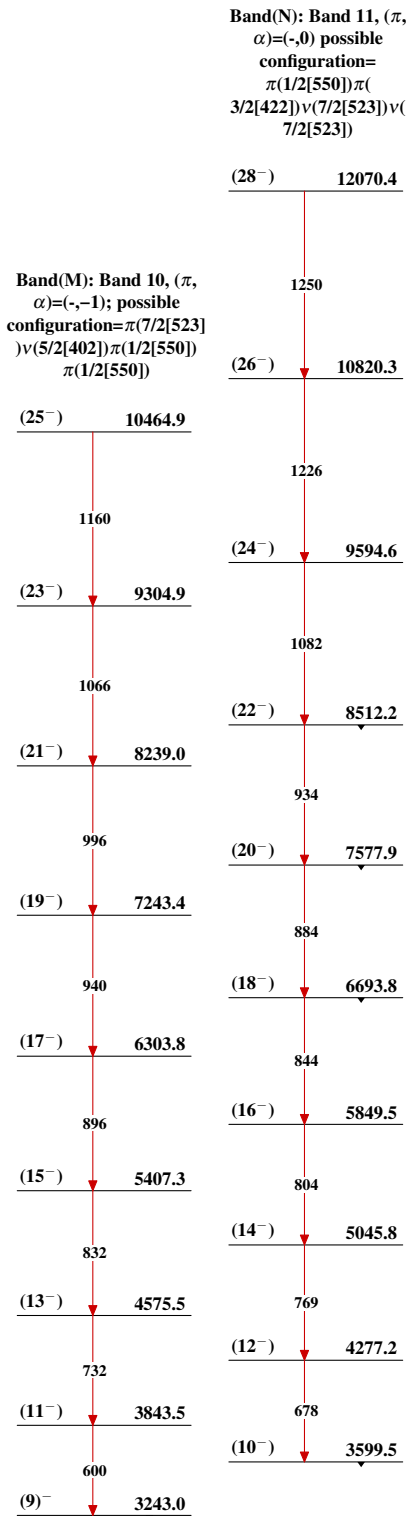
Intensities: relative I(γ)



$^{122}_{54}\text{Xe}_{68}$

$^{96}\text{Zr}(\text{}^{30}\text{Si}, 4n\gamma)$ 1994Ti01, 1997Se06

$^{96}\text{Zr}(^{30}\text{Si},4n\gamma)$ 1994Ti01,1997Se06 (continued)

$^{96}\text{Zr}({}^{30}\text{Si}, 4n\gamma)$ 1994Ti01, 1997Se06 (continued) $^{122}_{54}\text{Xe}_{68}$