^{51}V(^{10}B,p2nγ) 2006Si37

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja and B. Singh	ENSDF	31-Oct-2015

2006Si37 (also 2005Si28,2005Si37): E=33, 36 MeV. Measured Eγ, Iγ, lifetimes, $\gamma\gamma$, pγ coin using the Saci-Perere γ-ray spectrometer consisting of a 4π-charged particle array of 11 plastic phoswich scintillator ΔE-E telescopes, and four Compton suppressed HPGe detectors (two placed at 37° and two at 101° with respect to the beam axis). Lifetimes measured using Doppler-shift attenuation method (DSAM) and line-shape analysis which included the recoil spread due to particle emission.

^{58}Co Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0[&]	2$^+$	70.86[@] d *6*	
24.66[b] *22*	5$^+$	9.10[@] h *9*	%IT=100
53.04[d] *23*	4$^+$	10.5[@] μs *3*	%IT=100
111.92[&] *10*	3$^+$		
366.30 *24*	3$^+$		
374.41[d] *23*	5$^+$	>0.69 ps	
457.78[&] *21*	4$^+$	>0.69 ps	
886.34 *23*	(4)$^+$		J$^\pi$: 3$^+$,4$^+$ in Adopted Levels.
1042.0 *7*	3$^+$		
1076.46[a] *25*	6$^+$	<0.069 ps	
1185.20[&] *24*	5$^+$	0.097 ps *14*	
1424.78[d] *24*	6$^+$	0.076 ps *21*	
1929.91[d] *24*	7$^+$	0.277 ps *28*	
2080.5 *3*	(6)$^+$		
2184.8 *8*			
2314.1[a] *3*	7$^+$	0.16 ps *+6−7*	
2415.2 *4*	(7)$^+$		
2425.5[c] *3*	7$^+$		
2695.3[b] *3*	6$^+$		
2733.6 *3*			
2735.55[f] *25*	6$^+$	0.17 ps *7*	
2768.5[e] *3*	(8)$^+$		
3068.57[f] *25*	7$^+$	0.076 ps *+7−28*	
3281.1 *4*			
3394.7[d] *4*	8$^+$	0.07 ps *4*	
3533.8[e] *4*	(9)$^+$		
3720.5[a] *4*			
3776.10[f] *25*	8$^+$	0.076 ps *7*	
3802.4[c] *4*	8$^+$		
3865.8 *4*			
4239.9[e] *6*			
4295.1[b] *4*	7$^+$		E(level): based on the ordering of the 802-1600 cascade from the 5097 level as shown in figure 1 of 2006Si37. In authors′ table I, the ordering is given as reversed which gives energy of the intermediate level at 3498 keV.
4336.0 *5*			
4480.1[f] *3*	9$^+$	0.076 ps *7*	
4568.7[a] *7*			
4775.0 *7*			
5058.5[f] *3*	10$^+$	0.094 ps *10*	
5097.4[b] *4*	8$^+$		

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^{51}V(^{10}B,p2nγ) 2006Si37 (continued)

^{58}Co Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡	E(level)†	Jπ‡
5502.2[c] 5	(9)+		6427.0[b] 4	9+	7685.4 11	
5685.6 4			6511.4[f] 5		7691.7[c] 9	
5956.1 6	(10)+		6671.5 6		8044.1[b] 8	10+
6002.4[f] 3	11+	0.062 ps 6	7024.6[f] 6			

† From least-squares fit to Eγ data. Using the uncertainties given 2006Si37, normalized χ^2=6.8 is much larger than the critical value of 2.0. The evaluators have increased the uncertainties of the following γ rays as follows to obtain an acceptable fit: 0.14 keV for 727.63γ, 0.3 keV for 1050.9γ, 0.2 keV for 1550.7γ and 0.6 keV for 1460.5γ.

‡ As proposed by 2006Si37 based on γγ(θ)(DCO) measurements and band associations. In Adopted Levels dataset, the assignments are the same, except that parentheses have been added when strong arguments are lacking.

From Doppler-shift attenuation method (2006Si37), unless otherwise stated.

@ From Adopted Levels.

& Band(A): g.s. Band.

a Band(B): γ cascade based on 6+.

b Band(C): γ cascade based on 5+.

c Band(D): γ cascade based on 7+.

d Band(E): Band based on 4+.

e Band(F): γ cascade based on (8)+.

f Band(G): Band based on 6+.

γ(^{58}Co)

DCO=$I_\gamma(\gamma_1$ at 37°; gated with γ_2 at 101°)/ $I_\gamma(\gamma_1$ at 101°; gated with γ_2 at 37°); expected R_{DCO}=1.0 and 0.49 for ΔJ=2 and ΔJ=1 transitions, respectively, with intermediate values for moderately mixed M1+E2 transitions. ΔJ=0 transitions could give values between 1.1 (pure dipole) and 0.44 (large mixing ratios). The gating transitions are ΔJ=2, quadrupole type, unless otherwise stated. For reference, DCO=0.458 for 321.37γ and 0.41 for 433.15γ are used.

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	Comments
111.9 1	>5	111.92	3+	0.0	2+		
321.37 4	>180	374.41	5+	53.04	4+		
332.0 2	2.6 3	3865.8		3533.8	(9)+		
333.06 4	43 2	3068.57	7+	2735.55	6+	D	DCO=0.40 9
345.9 2	2.1 2	457.78	4+	111.92	3+		Final level energy=24.8 in table I of 2006Si37 is a misprint, it should be 111.9 level.
349.70 14	1.01 6	374.41	5+	24.66	5+	D	DCO=0.59 18 DCO for gate on ΔJ=1, 1050γ.
366.5 3	>3	366.30	3+	0.0	2+		
433.15 6	20 2	457.78	4+	24.66	5+		
505.13 5	62 2	1929.91	7+	1424.78	6+	D	DCO=0.44 3
509.0 4	2.1 3	6511.4		6002.4	11+		
512.0 4	2.1 4	886.34	(4)+	374.41	5+		
512.6 2	4.7 4	3281.1		2768.5	(8)+		
513.2 3	3.0 3	7024.6		6511.4			
520.3 3	2.5 3	886.34	(4)+	366.30	3+		
533.6 3	2.7 3	4336.0		3802.4	8+		
578.35 4	54 2	5058.5	10+	4480.1	9+	D	DCO=0.57 6
584.6 8	1.5 4	1042.0	3+	457.78	4+		

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$^{51}V(^{10}B,p2n\gamma)$ 2006Si37 (continued)

$\gamma(^{58}Co)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
627.1 *2*	3.7 *3*	5685.6		5058.5	10^+		
675 *1*	0.6 *3*	1042.0	3^+	366.30	3^+		
702.1 *2*	20 *1*	1076.46	6^+	374.41	5^+	D	DCO=0.52 *6* E_γ: 702.1γ+704.0γ form a doublet structure. DCO for 702+704 doublet for gate on $\Delta J=1$, 578γ.
704.0 *1*	74 *3*	4480.1	9^+	3776.10	8^+	D	DCO=0.52 *6* E_γ: 702.1γ+704.0γ form a doublet structure. DCO for 702.1γ+704.0γ for gate on $\Delta J=1$, 578γ.
706.1 *5*	2.7 *5*	4239.9		3533.8	$(9)^+$		
707.53 *5*	80 *3*	3776.10	8^+	3068.57	7^+	D	DCO=0.50 *5*
727.63 *7*	27 *1*	1185.20	5^+	457.78	4^+	D	DCO=0.38 *3* E_γ: Level-energy difference=727.4.
765.3 *2*	5.0 *4*	3533.8	$(9)^+$	2768.5	$(8)^+$	D	DCO=0.45 *5*
774.1 *3*	2.6 *3*	886.34	$(4)^+$	111.92	3^+		Initial level energy=866 in table I of 2006Si37 is a misprint, it should be 886 level.
802.3† *1*	22 *2*	5097.4	8^+	4295.1	7^+	D	DCO=0.54 *7*
803.7 *1*	4.1 *5*	2733.6		1929.91	7^+		
838.6 *1*	11.5 *6*	2768.5	$(8)^+$	1929.91	7^+	D	DCO=0.36 *4*
848.2 *5*	4.1 *6*	4568.7		3720.5			
895.3 *2*	11.5 *8*	2080.5	$(6)^+$	1185.20	5^+	D	DCO=0.34 *5*
943.95 *7*	27 *1*	6002.4	11^+	5058.5	10^+	D	DCO=0.30 *5*
985.9 *4*	3.3 *3*	6671.5		5685.6			
990.4 *3*	9.1 *7*	2415.2	$(7)^+$	1424.78	6^+	D	DCO=0.38 *6*
999.6 *7*	2.9 *6*	2184.8		1185.20	5^+		
1000.7 *2*	7.7 *7*	2425.5	7^+	1424.78	6^+	D	DCO=0.32 *8*
1050.37 *5*	100 *4*	1424.78	6^+	374.41	5^+	D	DCO=0.47 *3*
1050.9 *1*	131 *13*	1076.46	6^+	24.66	5^+	D	DCO=0.31 *6* E_γ: Level-energy difference=1051.4. DCO for gate on $\Delta J=0$, 1659γ.
1131.9 *4*	7.3 *8*	1185.20	5^+	53.04	4^+		
1161 *1*	2.5 *7*	1185.20	5^+	24.66	5^+		
1237.6 *1*	48 *3*	2314.1	7^+	1076.46	6^+	D	DCO=0.46 *9*
1241.2 *6*	2.6 *4*	4775.0		3533.8	$(9)^+$		
1270.3 *3*	7.6 *8*	2695.3	6^+	1424.78	6^+		
1329.6 *2*	10.9 *8*	6427.0	9^+	5097.4	8^+	D	DCO=0.38 *8* DCO for gate on $\Delta J=1$, 1600γ.
1376.9 *2*	12.3 *8*	3802.4	8^+	2425.5	7^+	D	DCO=0.64 *9*
1402 *2*	2.7 *11*	1424.78	6^+	24.66	5^+	D	DCO=0.59 *11* DCO for gate on $\Delta J=1$, 505γ.
1406.2 *5*	8.4 *9*	3720.5		2314.1	7^+		
1460.5 *3*	9.0 *6*	3776.10	8^+	2314.1	7^+	D	DCO=0.39 *5* E_γ: Level-energy difference=1461.9.
1464.8 *2*	15.8 *8*	3394.7	8^+	1929.91	7^+	D	DCO=0.59 *8*
1550.7 *1*	17 *1*	2735.55	6^+	1185.20	5^+	D	DCO=0.47 *5* E_γ: Level-energy difference=1550.3.
1554.7 *5*	23 *1*	1929.91	7^+	374.41	5^+	(Q)	DCO=0.75 *8*
1599.8† *1*	29 *1*	4295.1	7^+	2695.3	6^+	D	DCO=0.38 *7* DCO for gate on $\Delta J=1$, 802γ.
1617.1 *7*	3.0 *5*	8044.1	10^+	6427.0	9^+	D	DCO=0.54 *12* DCO for gate on $\Delta J=1$, 1600γ.
1644.2 *6*	3.1 *4*	3068.57	7^+	1424.78	6^+		
1659.2 *1*	19 *1*	2735.55	6^+	1076.46	6^+	D	DCO=0.39 *6* DCO for gate on $\Delta J=1$, 1051γ.
1699.8 *3*	6.7 *6*	5502.2	$(9)^+$	3802.4	8^+	D	DCO=0.25 *13*
1790.7 *4*	5.1 *5*	3720.5		1929.91	7^+		

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^{51}V(^{10}B,p2nγ) 2006Si37 (continued)

γ(^{58}Co) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
1991.9 *1*	42 *2*	3068.57	7^+	1076.46	6^+	D	DCO=0.52 *9* DCO for gate on ΔJ=1, 578γ.
2189.4 *7*	2.7 *4*	7691.7		5502.2	$(9)^+$		
2361.0 *2*	9.9 *6*	2735.55	6^+	374.41	5^+	D	DCO=0.52 *7*
2422.2 *4*	4.4 *4*	5956.1	$(10)^+$	3533.8	$(9)^+$	D	DCO=0.68 *13*
2670.7 *3*	21 *3*	2695.3	6^+	24.66	5^+	D	DCO=0.37 *8* DCO for gate on ΔJ=1, 1600γ.
2710 *1*	2.0 *4*	2735.55	6^+	24.66	5^+	D	DCO=0.45 *10* DCO for gate on ΔJ=1, 333γ.
3349.3 *9*	2.1 *3*	7685.4		4336.0			

† Ordering of the 802-1600 cascade is from the level scheme figure 1 of 2006Si37. It is listed as reversed in authors′ table I. The ordering given in the level scheme figure seems preferred from the relative intensities of the two γ rays.

‡ From DCO ratios; dipole character is implied from ΔJ=1 transition. Small quadrupole admixture is also possible.

$^{51}V(^{10}B,p2n\gamma)$ 2006Si37

Level Scheme

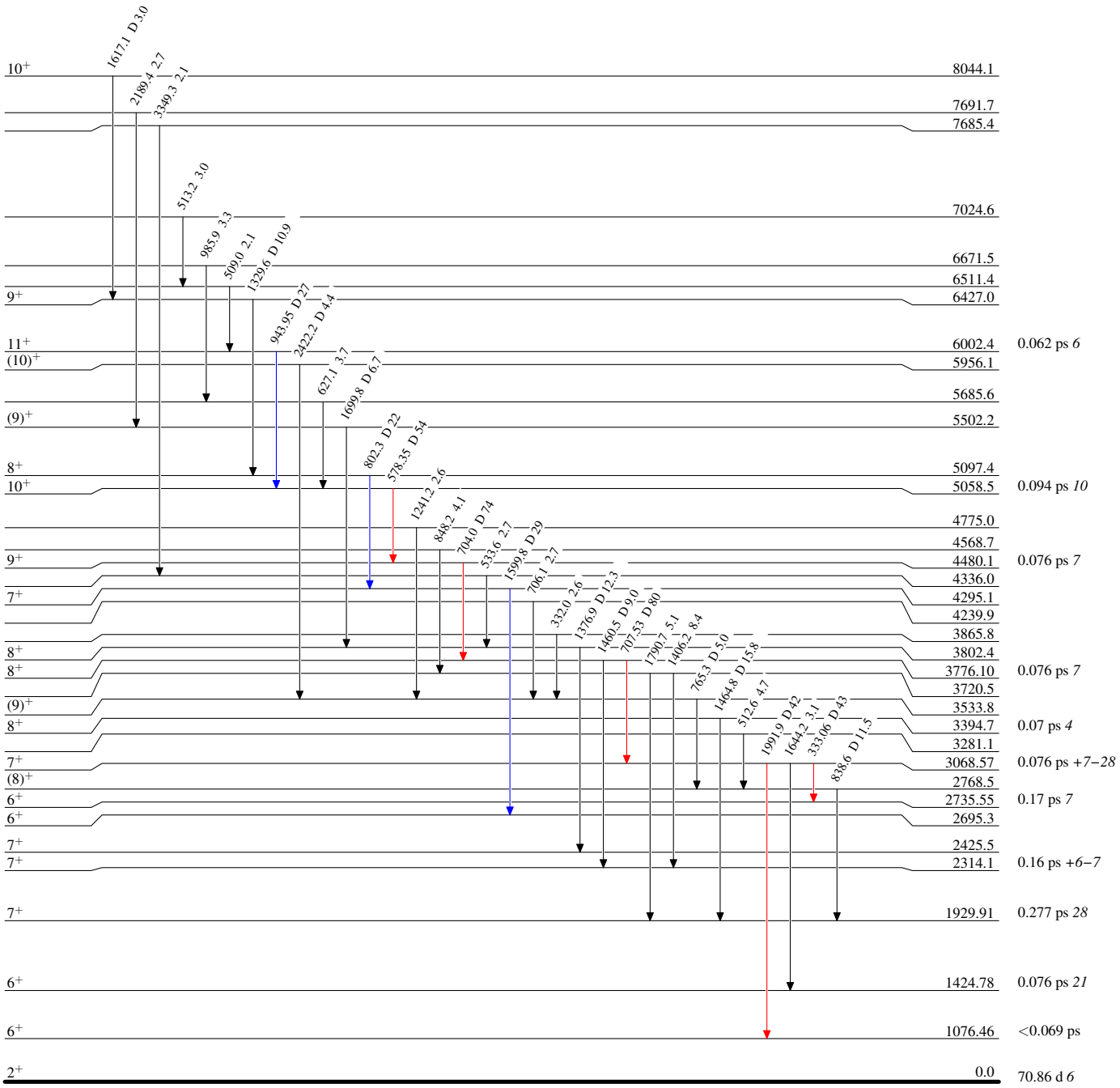
Intensities: Relative I_γ

Legend

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

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

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



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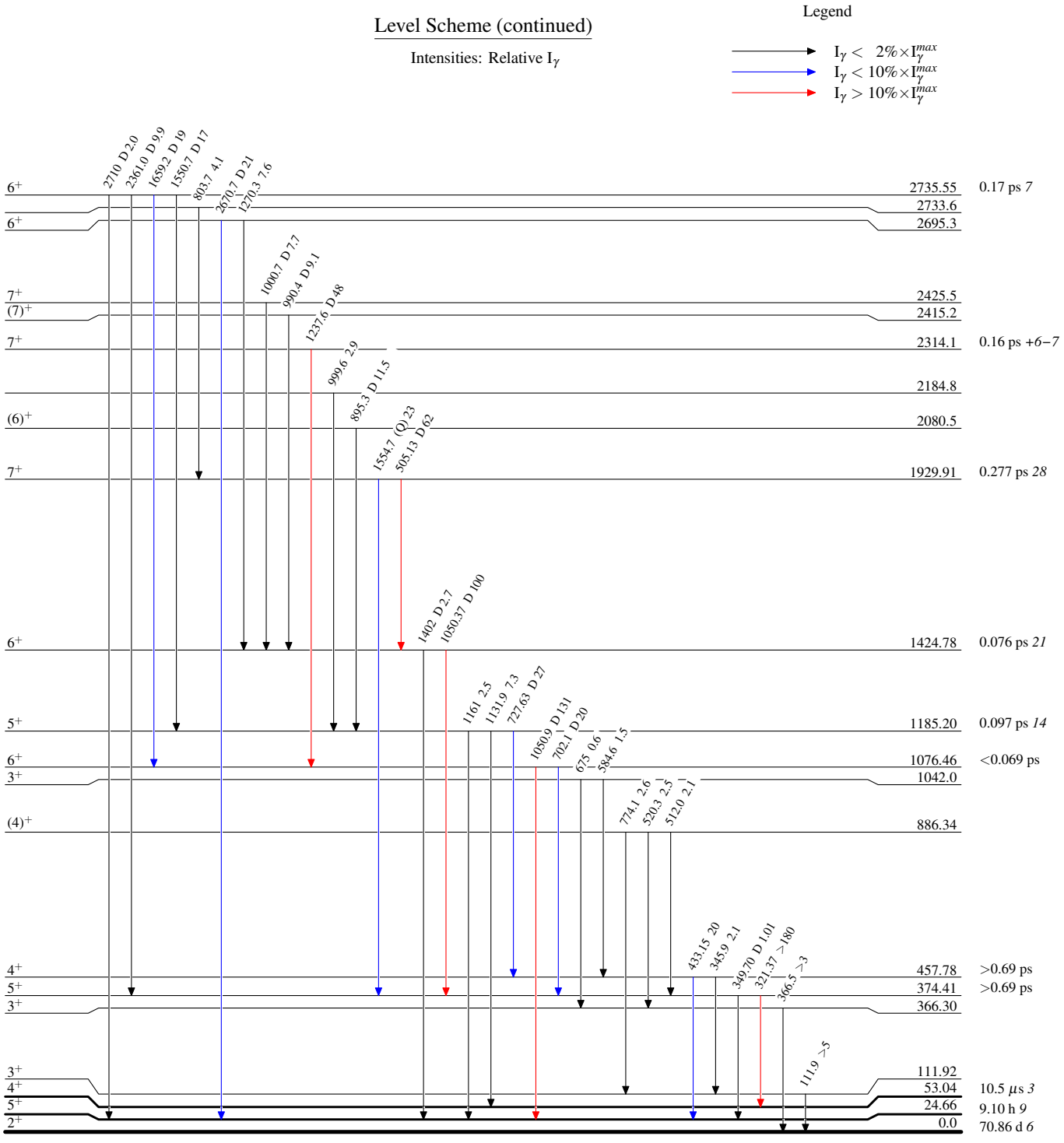
$^{51}V(^{10}B,p2n\gamma)$ **2006Si37**

Level Scheme (continued)

Intensities: Relative I_γ



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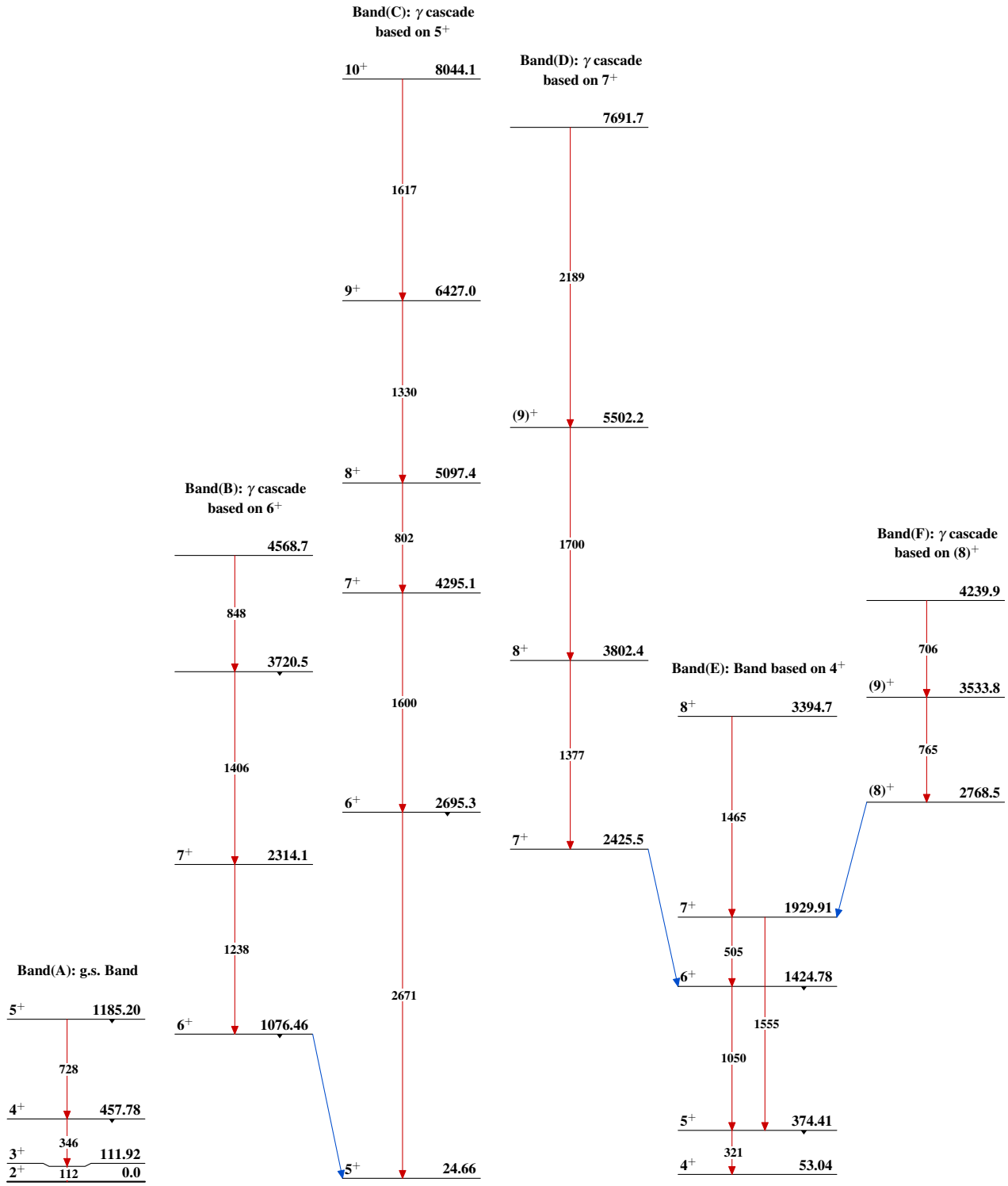
$^{51}V(^{10}B,p2n\gamma)$ 2006Si37



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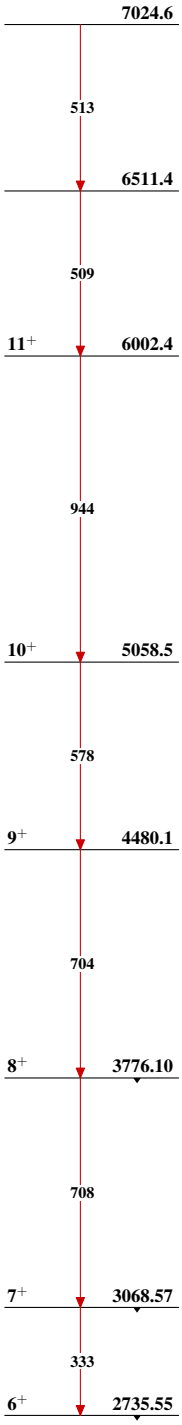
$^{51}V(^{10}B,p2n\gamma)$ 2006Si37 (continued)

Band(G): Band based on 6^+



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