^{50}Cr(p,nγ) 2000Sc35

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 157, 1 (2019)	15-Apr-2019

2000Sc35 (also 2002Vo12): E=15 MeV. Measured Eγ, Iγ, γγ, γγ(θ) and γγ(lin pol) using OSIRIS-CUBE spectrometer equipped with six Compton-suppressed HPGe detectors. In Part 2 of the experiment, a highly efficient composite Cluster detector replaced one of the Compton-suppressed HPGe detectors. Shell-model calculations.

Other:

1971Ki17: E=7-16 MeV beam from the University of Colorado 1.3-m sector-focusing cyclotron. γ rays were detected with a Ge(Li) detector and neutrons by a liquid scintillator. Measured Eγ, Iγ, nγ-coin. Deduced levels. The results are given in the table below and in good agreement with those from 2000Sc35.

All data are from 2000Sc35, unless otherwise noted.

^{50}Mn Levels

E(level)†	Jπ#	$T_{1/2}$	Comments
0.0	0^+		
225.28 *9*	5^+	1.75 min *3*	E(level),$T_{1/2}$: from Adopted Levels. Additional information 1.
650.86 *8*	1^+		
800.02 *7*	2^+		
1030.4‡ *5*	7^+		
1143.01 *9*	3^+		
1684.6?‡ *20*			E(level): level and 1684γ not included in Adopted Levels.
1727.20 *10*	1^-		Jπ: from Compton asymmetry and angular distribution of γ rays.
1765.4‡ *5*			
1797.73 *13*	3		
1874.41 *8*	2		
1916.61 *14*	5^+		Jπ: from Adopted Levels; 4^+ assigned in 2000Sc35.
1931.26 *11*	4^+		Jπ: 4-3-2 spin sequence established for 1931-1143-800 levels from the measurement of (788γ)(343γ)(θ) (2000Sc35). The γγ(θ) data are inconsistent with J(1931)=1,2,3. Parity is from ΔJ=2, quadrupole transition to 2^+ and RUL.
2157.32 *14*			
2300.54 *13*			
2339.98 *16*	$3^{(-)}$		Jπ: $(3^-,4^+)$ in Adopted Levels.
2477.75 *13*	3		
2556.69 *12*	(5)		
2614.4 *5*			
2715.93 *11*			
2979.91 *22*			
3369.99 *19*			
3438.48 *15*			
3477.49 *11*			
3561.76 *24*			
3637.85 *20*			

† From least-squares fit to γ-ray energies.

‡ Level from 1971Ki17 only.

As assigned in 2000Sc35, based on their γ(θ) and γ(lin pol) measurements, but few details are available.

^{50}Cr(p,nγ) 2000Sc35 (continued)

γ(^{50}Mn)

POL values from γ(lin pol) using Compton asymmetry are from 2000Sc35. Positive values are indicative of dominant electric multipole character and negative values that of magnetic character.

Relative intensities of γ rays (1971Ki17)
(Relative to 10000 for 783.4γ in ^{50}Cr)

Eγ	Iγ	Eγ	Iγ
149.0 5	481 7	906 2	8 3 a
343.1 5	355 4	927.1 5	47 6
433 1	117 3	1224.2 5	80 3
651.0 5	639 9	1540.1 5	81 5
731 2	15 3 a	1572.9 5	46 9
800.2 5	271 9	1684.2 5	16 6 a
805.1 5	104 8	1706 3	
840 2	8 3 a	1755 3	15 5 a
888.0 5	203 13		

a: intensity from neutron-γ coincidences

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	δ[†]	Comments
650.86	1+	650.8 *1*	100	0.0	0+	M1		POL=−0.021 *1*.
800.02	2+	149.2 *1*	64.1 *12*	650.86	1+	D(+Q)	+0.02 *3*	Iγ(149γ)/Iγ(800γ)=1.77 *6* (1971Ki17) is in disagreement with 0.64 *2* from 2000Sc35, but in a good agreement with the ratio in ^{50}Fe ε decay. See Adopted Gammas.
		800.0 *1*	100 *2*	0.0	0+	E2		POL=+0.045 *3*.
1030.4	7+	805.1[‡#] *5*	100	225.28	5+			
1143.01	3+	343.0 *1*	100 *2*	800.02	2+	M1(+E2)	+0.01 *2*	POL=−0.040 *1*.
		492.0 *1*	1.2 *1*	650.86	1+			
1684.6?		1684.2[‡#] *5*		0.0	0+			
1727.20	1−	927.1 *1*	49.5 *12*	800.02	2+	D(+Q)	+0.05 *10*	δ(Q/D)=+1.3 *+44−8* is also possible but not likely for a 1− to 2+ transition.
		1727.4 *2*	100.0 *23*	0.0	0+	E1		POL=+0.031 *1*.
1765.4		1540.1[‡] *5*	100	225.28	5+			
1797.73	3	997.7 *1*	100	800.02	2+	D(+Q)	−0.12 *10*	
		1572.9[‡] *5*		225.28	5+			
1874.41	2	731.2 *2*	34.4 *10*	1143.01	3+	D(+Q)	0.00 *3*	δ: 0.00 *3*.
		1074.4 *1*	31 *1*	800.02	2+	D+Q	−3.7 *+4−5*	
		1223.6 *1*	100.0 *24*	650.86	1+	D(+Q)	−0.01 *2*	
		1874.4 *2*	50.0 *15*	0.0	0+			
1916.61	5+	773.6 *1*	100	1143.01	3+			Mult.: M1+E2, δ=+2.55 *27* for J^π=4+ for 1917 level in 2000Sc35, but for revised J^π=5+, the transition should be pure E2.
1931.26	4+	788.0 *1*	100 *3*	1143.01	3+	D(+Q)	−0.01 *2*	
		1131.2 *2*	5.9 *8*	800.02	2+	Q		
		1706[‡#] *3*		225.28	5+			E_γ: γ not included in Adopted Gammas.
2157.32		1014.3 *1*	100	1143.01	3+			
2300.54		1500.5 *1*	100	800.02	2+			
2339.98	3(−)	612.5 *2*	13.1 *14*	1727.20	1−			
		1540.2 *2*	100 *3*	800.02	2+	D+Q	−0.13 *4*	
2477.75	3	1677.7 *1*	100	800.02	2+	D(+Q)	+0.01 *6*	
2556.69	(5)	625.2 *1*	100 *3*	1931.26	4+			

Continued on next page (footnotes at end of table)

^{50}Cr(p,nγ) 2000Sc35 (continued)

γ(^{50}Mn) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
2556.69	(5)	1413.9 *1*	52 *2*	1143.01	3^+	3438.48		1507.2 *1*	100	1931.26	4^+
2614.4		887.2 *4*	100	1727.20	1^-	3477.49		1603.0 *1*	100 *6*	1874.41	2
2715.93		841.6 *1*	100 *4*	1874.41	2			1750.3 *1*	99 *6*	1727.20	1^-
		1572.8 *1*	7.6 *4*	1143.01	3^+	3561.76		1261.2 *2*	100	2300.54	
2979.91		2329.0 *2*	100	650.86	1^+	3637.85		1706.5 *2*	29 *2*	1931.26	4^+
3369.99		1030.0 *1*	100	2339.98	$3^{(-)}$			2494.9 *3*	100 *6*	1143.01	3^+

† From γγ(lin pol) and γγ(θ) data. Details of the latter measurements are not available in 2000Sc35.
‡ γ from 1971Ki17 only.
# Placement of transition in the level scheme is uncertain.

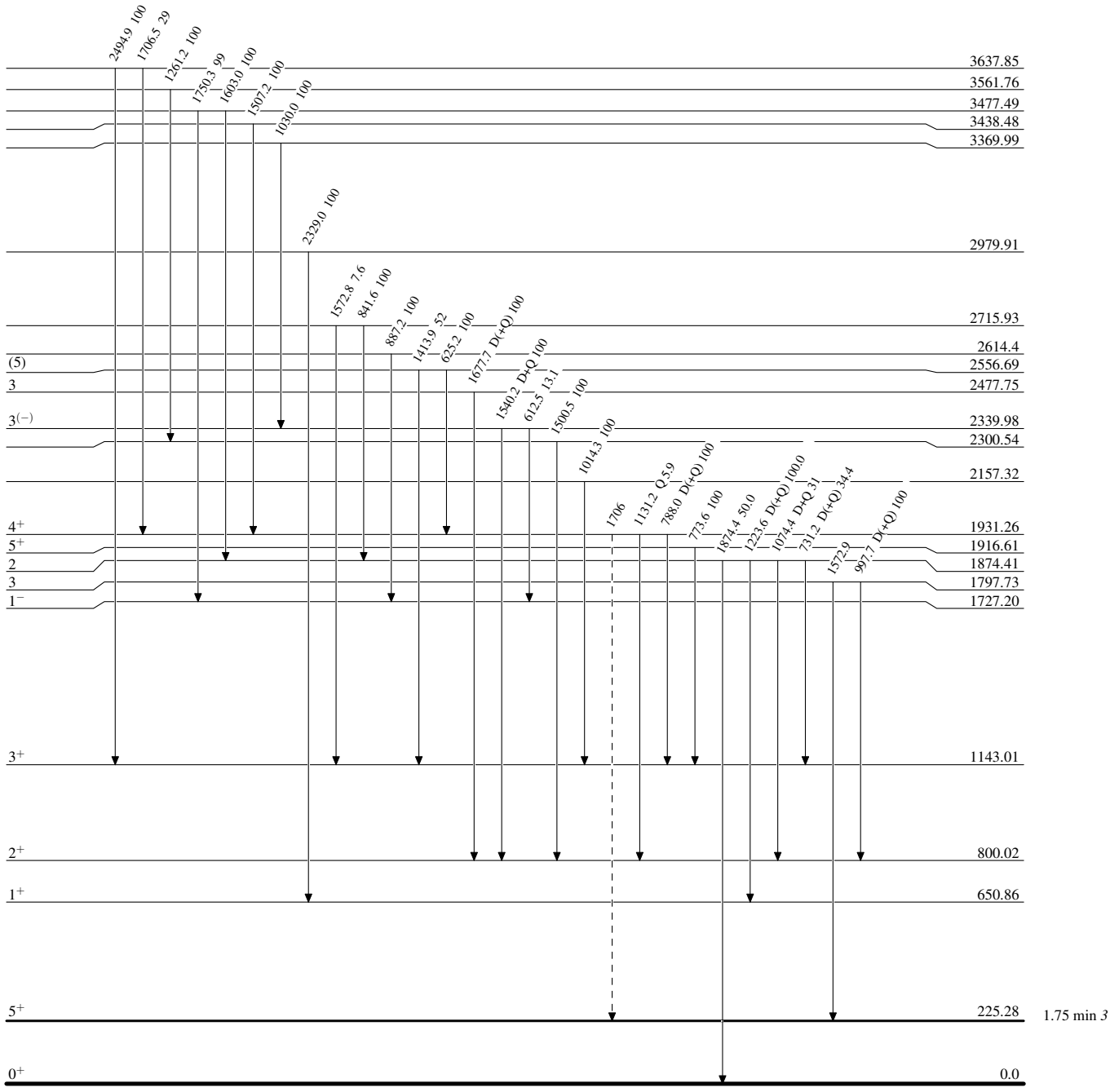
^{50}Cr(p,nγ) 2000Sc35

Legend

Level Scheme

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



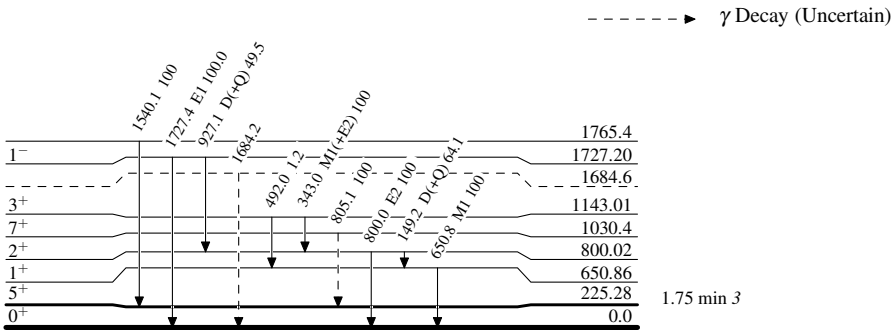
$^{50}_{25}Mn_{25}$

^{50}Cr(p,nγ) 2000Sc35

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{50}_{25}Mn_{25}$