^{50}Cr(p,p′) 1966Ma42,1974Pe01,1989Wi13

History

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

1966Ma42: E(p)=11-12 MeV. Measured proton spectrum with the Harwell single-gap (FWHM=8 keV) and the Aldermaston multi-angle (FWHM=12 keV) magnetic spectrograph. Deduced levels. Report 84 levels up to 6376.

1974Pe01,1972Pe28: E(p)=22.86 MeV beam from the University of Colorado 1.3-m AVF cyclotron. Measured $\sigma(\theta=10°-135°)$ with Si detector (FWHM=40 keV). Deduced levels, J, π, L-transfers, deformation lengths from DWBA analysis. L=3 data and analysis in 1972Pe28. Report 32 levels up to 8680.

1989Wi13: E(p)=201 MeV beam from the Orsay synchrocyclotron. 90.12% enriched target. Measured $\sigma(\theta=3°-8°$, 1° steps) with FWHM=110 keV. Spin-flip transitions. Deduced 1^+ levels.

Others:

1985Ko07: E=5.81, 6.07 MeV. Measured $\sigma(\theta)$.

1978An08: E=5.65-5.95 MeV. Measured $\sigma(E,\theta)$.

1971An17: E=6 MeV. Measured $\sigma(\theta)$, deduced levels, deformation parameter.

1971Pa14: E=6.9 MeV. Measured $\sigma(\theta)$, deduced deformation parameter.

1968Ro09: E=7.5 MeV. Measured $\sigma(\theta)$ for 15 levels up to 3929 keV using MIT-ONR electrostatic generator and the MIT multiple-gap spectrograph.

1968Mo07: (p,p′), (p,p′γ), E=6.33,6.45 MeV. Measured proton spectra, Eγ, Iγ, pγ-coin, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$. Deduced levels, J^π, mixing ratios using 12 MeV tandem Van de Graaff accelerator at Liverpool University. See (p,p′γ) dataset for details.

1965Sp10: E=7.5 MeV. Measured $\sigma(\theta)$. See 1968Ro09 from the same lab.

1964Tw01: E=6.2,7.5 MeV. Measured proton spectra.

1964Bj01: E=3-4.3 MeV. First excited 2^+ state investigated.

^{50}Cr Levels

Cross sections measured at 4° in 1989Wi13 are given under comments.

E(level)[†]	J^π[@]	L[&]	$(\beta_L R)^2$[a]	Comments
0.0				
782 *3*		2	1.14	E(level): from 1964Bj01. Others: 786 *7* (1966Ma42), 783 *20* (1974Pe01), 778 *10* (1968Ro09).
1880 *7*				E(level): others: 1888 *20* (1974Pe01), 1875 *10* (1968Ro09).
2922 *7*		2	0.034	E(level): others: 2924 *20* (1974Pe01), 2919 *10* (1968Ro09).
3156 *7*		2	0.114	E(level): others: 3161 *20* (1974Pe01), 3156 *10* (1968Ro09).
3317 *7*		(4)	0.032	E(level): others: 3325 *20* (1974Pe01), 3320 *10* (1968Ro09).
3587 *7*				E(level): others: 3595 *20* (1974Pe01), 3590 *10* (1968Ro09).
3602 *7*		(4)	0.143	E(level): others: 3611 *20* (1974Pe01), 3606 *10* (1968Ro09).
3621 *7*	1^+			E(level): other: 3621 *10* (1968Ro09). $d\sigma/d\Omega$=170 *14* μb/sr.
3692 *7*		4	0.054	E(level): others: 3698 *20* (1974Pe01), 3694 *10* (1968Ro09).
3786 *7*		4		E(level): others: 3792 *20* (1974Pe01), 3788 *10* (1968Ro09).
3821 *7*				E(level): other: 3820 *10* (1968Ro09).
3838 *7*				E(level): others: 3844 *20* (1974Pe01), 3839 *10* (1968Ro09).
3867 *7*				E(level): others: 3875 *20* (1974Pe01), 3869 *10* (1968Ro09).
3888 *7*		4	0.240	E(level): others: 3898 *20* (1974Pe01), 3890 *10* (1968Ro09).
3927 *7*				E(level): others: 3938 *20* (1974Pe01), 3929 *10* (1968Ro09).
4045 *7*		3	0.643	E(level): other: 4050 *20* (1972Pe28). J^π: 0^+ from $\sigma(\theta)$ for a level at 4040 in 1989Wi13; but 3^- from $\gamma(\theta)$ in (1972Pe28).
4063 *7*				
4123 *7*				
4188 *7*	(2^+)	2	0.119	E(level): other: 4193 *20* (1974Pe01).
4207 *7*				
4282 *7*				

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^{50}Cr(p,p′) 1966Ma42,1974Pe01,1989Wi13 (continued)

^{50}Cr Levels (continued)

E(level)[†]	Jπ[@]	L[&]	$(\beta_L R)^2$[a]	Comments
4363 *7*		5	0.131	E(level): other: 4370 *20* (1972Pe28).
4523 *7*				
4543 *7*		3	0.100	E(level): other: 4570 *20* (1972Pe28).
4653 *7*				
4676 *7*		(2)	0.007	E(level): other: 4680 *20* (1974Pe01).
4700	(1^+)			E(level): from 1989Wi13. $d\sigma/d\Omega$=116 *20* μb/sr.
4728 *7*				
4755 *7*		(2)	0.006	L,$(\beta_L R)^2$: for a level at 4770 *20* (1974Pe01).
4772 *7*		(2)	0.006	L,$(\beta_L R)^2$: for a level at 4770 *20* (1974Pe01).
4801 *7*				
4906 *7*				
4924 *7*		(4)	0.021	L,$(\beta_L R)^2$: for a level at 4940 *20* (1974Pe01).
4961 *7*		(4)	0.021	L,$(\beta_L R)^2$: for a level at 4940 *20* (1974Pe01).
4993 *7*				
5015 *10*				
5039 *10*				
5053 *10*				
5078 *10*				
5093 *10*				
5198 *10*				
5207 *10*				
5233 *10*		4	0.044	L,$(\beta_L R)^2$: for a level at 5230 *20* (1974Pe01).
5250 *10*			0.044	L,$(\beta_L R)^2$: for a level at 5230 *20* (1974Pe01).
5272 *10*				
5297 *10*				
5336 *10*				
5376 *10*				
5429 *10*				
5445 *10*		(3)	0.058	L,$(\beta_L R)^2$: for a level at 5450 *20* (1972Pe28).
5455 *10*		(3)	0.058	L,$(\beta_L R)^2$: for a level at 5450 *20* (1972Pe28).
5548 *10*				
5597 *10*				
5611 *10*				
5623 *10*				
5684 *10*				
5731 *10*				
5741 *10*		(3)	0.24	L,$(\beta_L R)^2$: for a level at 5760 *20* (1972Pe28).
5780 *10*		(3)	0.24	L,$(\beta_L R)^2$: for a level at 5760 *20* (1972Pe28).
5813 *10*				
5835 *10*				
5859 *10*				
5903 *10*				
5929 *10*				
5944 *10*				
5957 *10*				
5983 *10*		(3)	0.135	L,$(\beta_L R)^2$: for a level at 5990 *20* (1972Pe28).
6003 *10*		(3)	0.135	L,$(\beta_L R)^2$: for a level at 5990 *20* (1972Pe28).
6027[‡] *10*				
6032[‡] *10*				
6071 *10*				
6083 *10*				
6116[‡] *10*				
6123[‡] *10*				

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^{50}Cr(p,p′) 1966Ma42,1974Pe01,1989Wi13 (continued)

^{50}Cr Levels (continued)

E(level)†	Jπ@	L&	$(\beta_L R)^2$a	Comments
6138 *10*		3	0.054	E(level): other: 6150 *20* (1972Pe28).
6175 *10*				
6202 *10*				
6226‡ *10*				
6230‡ *10*				
6243 *10*				
6272 *10*				
6305 *10*				
6330 *10*				
6342 *10*				
6376 *10*				
6450# *20*		3	0.105	
6650# *20*		(3)	0.139	
6790# *20*		3	0.098	
7340	1^+			dσ/dΩ=143 *20* μb/sr.
7360# *20*		(3)	0.031	
7610	1^+			dσ/dΩ=100 *16* μb/sr.
7780	1^+			dσ/dΩ=85 *20* μb/sr.
7860# *20*		(3)	0.090	
7.98×10^3	1^+			dσ/dΩ=254 *25* μb/sr.
8.27×10^3	1^+			dσ/dΩ=217 *30* μb/sr.
8.50×10^3	1^+			dσ/dΩ=238 *35* μb/sr.
8.65×10^3	1^+			dσ/dΩ=203 *30* μb/sr.
8680# *20*		(3)	0.052	
9.01×10^3	1^+			dσ/dΩ=216 *30* μb/sr.
9.19×10^3	1^+			dσ/dΩ=182 *40* μb/sr.
9.40×10^3	1^+			dσ/dΩ=260 *30* μb/sr.
9.57×10^3	1^+			dσ/dΩ=131 *21* μb/sr.
9.71×10^3	1^+			dσ/dΩ=334 *40* μb/sr.
9.90×10^3	1^+			dσ/dΩ=170 *30* μb/sr.
10.11×10^3	1^+			dσ/dΩ=128 *35* μb/sr.
10.24×10^3	1^+			dσ/dΩ=111 *30* μb/sr.
10.38×10^3	1^+			dσ/dΩ=89 *30* μb/sr.
10.52×10^3	1^+			dσ/dΩ=130 *30* μb/sr.
10.82×10^3	1^+			dσ/dΩ=170 *20* μb/sr.
11.02×10^3	1^+			dσ/dΩ=50 *15* μb/sr.
11.18×10^3	1^+			dσ/dΩ=120 *30* μb/sr.
11.66×10^3	1^+			dσ/dΩ=70 *30* μb/sr.
11.82×10^3	1^+			dσ/dΩ=144 *25* μb/sr.
12.3×10^3 *3*	1^+			E(level): multiplet with E=12.10-12.45 MeV (1989Wi13). dσ/dΩ=194 *60* μb/sr.

† From 1966Ma42 up to 6376 and from 1989Wi13 above that, unless otherwise noted. Values are also available in 1974Pe01 and 1972Pe28, but less precise, for which the correspondences to levels in 1966Ma42 are made based on the fact that values in 1974Pe01 and 1972Pe28 are systematically higher by a few keV than those in 1966Ma42 for most of the levels.

‡ Unresolved doublet (1966Ma42).

From 1972Pe28.

@ From 1989Wi13 based on $\sigma(\theta)$ compared with DWIA calculations. Populations of 1^+ levels are interpreted as spin-flip transition from forward angle cross sections.

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^{50}Cr(p,p′) 1966Ma42,1974Pe01,1989Wi13 (continued)

^{50}Cr Levels (continued)

& From DWBA fit to measured $\sigma(\theta)$ (1974Pe01 and 1972Pe28). Parentheses are added by evaluators for apparent poor fit in the fitting plots.

[a] Square of deformation lengths, from 1972Pe28 and 1974Pe01.