^{50}Cr(^{3}He,t) 1972Mc02,1972Fa01,2005Fu16

History

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

1972Fa01: experiment performed at Univ. Colorado cyclotron. E=21.4, 29.7, 37.5 MeV ^{3}He beam hit enriched ^{50}Cr foil. Tritons analyzed by ΔE-E Si telescope. Energy resolution (FWHM) was 70-130 keV. Excitation energies (ΔE=8-20 keV), angular distributions determined. Spin/parity assignment and deformation parameters deduced. DWBA analysis.

1972Mc02: experiment performed at Oak Ridge cyclotron. E=39.45 MeV ^{3}He beam hit enriched ^{50}Cr foil. Tritons analyzed by magnetic spectrograph. Energy resolution FWHM=30-40 keV. Excitation energies, angular distributions determined. Spin/parity assignment deduced. DWBA analysis.

2005Fu16, 2014Fu02 (also conference articles from the same group: 2016Fu02, 2012Fu02, 2009Fu15, 2008Fu04, 2007Ad27): E=140 MeV/nucleon. The tritons were analyzed from 0°−2° using Grand Raiden spectrometer at RCNP cyclotron facility. FWHM=29 KeV. Deduced Gamow-Teller strengths.

Additional information 1.

Others (Coulomb energy shifts): 1971Be29, 1967ShZZ and 1966Sh02.

^{50}Mn Levels

E(level)[†]	Jπ	L[@]	B(GT) strength[&]	Comments
0	0$^+$	0		T=1 E(level),Jπ: L=0; IAS of ^{50}Cr g.s.
229 *8*	(5$^+$,6$^+$)[‡]			T=0 Jπ: 5$^+$ in Adopted Levels.
652 *4*	(1)$^+$[#]	0	0.50 *13*	T=(0) E(level): 651 (2014Fu02, from γ-ray data).
800 *4*	(2$^+$,1$^+$)[‡]	≥1		T=(1,0) Jπ: 2$^+$ in Adopted Levels. E(level): possible IAS of T=1 *583* level in ^{50}Cr. β_2=0.31 *5* assuming J=2, (DWBA, 1972Fa01).
1030 *15*	(7$^+$)[‡]			T=(0)
1147 *4*	(3$^+$,4$^+$)[‡]	≥1		T=(0) Jπ: 3$^+$ in Adopted Levels. β_4=0.36 *6* assuming J=4 (DWBA, 1972Fa01).
1805 *4*	(3$^+$,4$^+$)[‡]	≥1		T=(1) Jπ: (3$^+$) in Adopted Levels. E(level): IAS of T=1 *1881* level in ^{50}Cr. β_4=0.44 *8* assuming J=4 (DWBA, 1972Fa01).
1860[c] *15*	(1$^+$,2$^+$)[‡]			T=(0) Jπ: 2$^{(+)}$ in Adopted Levels.
1920 *15*	(5$^+$,6$^+$)[‡]			T=(0) Jπ: 5$^+$ in Adopted Levels.
2290 *20*				
2340? *20*				
2411 *4*	(1)$^+$[#]	0	0.15 *4*	E(level): 2404 (2014Fu02, from γ-ray data).
2455 *20*				
2555 *20*				
2685? *20*				
2694 *4*	(1)$^+$[#]	0	0.11 *3*	
2790 *4*	(1)$^+$[#]	0	0.03 *1*	
2975 *20*				
3080?[bc] *20*				
3177 *4*		≥1		
3200?[b] *20*				

Continued on next page (footnotes at end of table)

^{50}Cr(^{3}He,t) 1972Mc02,1972Fa01,2005Fu16 (continued)

^{50}Mn Levels (continued)

E(level)[†]	Jπ	L[@]	B(GT) strength[&]	Comments
3240[c] *20*				
3392 *4*	(1)$^{+}$[#]	0	0.35 *9*	E(level): 3380 (2014Fu02, from γ-ray data).
3440 *20*				
3520[b] *20*				
3654 *4*	(1)$^{+}$[#]	0	0.14 *4*	
3690?[bc] *15*				
3770?[bc] *15*				
3850[c]				
4028 *4*	(1)$^{+}$[#]	0	0.07 *2*	
4333[a] *4*	(1)$^{+}$[#]	0	0.11 *3*	E(level): 4316 (2014Fu02, from γ-ray data).
4584[a] *4*	(1)$^{+}$[#]	0	0.03 *1*	
5728[a] *4*				E(level): from 2007Ad27, peak is also in spectral figure 2 of 2005Fu16.

[†] From 2005Fu16 when uncertainty is 4 keV. Corresponding values from 1972Mc02 and 1972Fa01 are in agreement but less precise. For levels not reported in 2005Fu16, weighted averages values from 1972Mc02 and 1972Fa01 are taken, unless otherwise stated. Above 5 MeV excitation, there are four peaks in the spectral figure 2 of 2005Fu16, the most intense is near 5730 keV which is listed here. In 2014Fu02, a few of the level energies are given which are consistently lower than those in 2005Fu16. In e-mail reply of May 5, 2014, Y. Fujita mentioned that energies listed in Figure 1c of 2014Fu02 paper are from unpublished gamma-ray data. These values are expected to be more accurate, and are given in comments here. This implies that energies of other levels from 2005Fu16 are also shifted upward systematically. Uncertain levels reported only in (^{3}He,t) are not given in the Adopted Levels.

[‡] From DWBA analysis of angular distributions assuming pure $(f_{7/2})^{-6}$ shell-model configurations for the ^{50}Cr and the residual ^{50}Mn states (1972Mc02,1972Fa01).

[#] L(^{3}He,t)=0 from 0^{+} target, interpreted as Gamow-Teller transition (2005Fu16).

[@] From comparison of intensities of states measured in spectra at 0°−0.5° and 1.5°−2.0°. All prominent states showed 0° peaked $\sigma(\theta)$ suggesting L=0 (probable Gamow-Teller states). Weakly populated states are suggested as L≥1 transitions (2005Fu16).

[&] Gamow-Teller strengths from 2005Fu16.

[a] Reported by 2005Fu16 only.

[b] Not seen at all the angles in 1972Mc02.

[c] Seen only in 1972Mc02.