

⁵⁰Cr(p,t) 1971Do18,1971Br52,1972Sh27

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

- 1971Do18:** E=51 MeV proton beam was produced from the Oak Ridge Isochronous cyclotron. Target was 682 μg/cm² self-supporting 95.9% enriched ⁵⁰Cr. Reaction products were momentum-analyzed with a broad-range spectrograph (FWHM=35 keV). Measured σ(θ=7°–50°, 10 angles). Deduced levels, J, π, L-transfers from DWBA analysis.
- 1971Br52:** E=40 MeV protons were produced from the variable-energy cyclotron at Grenoble. Target was 620 μg/cm² self-supporting 96% enriched ⁵⁰Cr. Tritons were detected with a Si counter telescope (FWHM=60 keV). Measured σ(θ(c.m.)≈10°–50°). Deduced levels, J, π, L-transfers from DWBA analysis.
- 1972Sh27:** E=27.2 MeV proton beam was produced from the 1.3-m University of Colorado sector-focusing cyclotron. Target was 0.72 mg/cm² self-supporting 95.9% enriched ⁵⁰Cr. Reaction products were detected with a E-ΔE Si surface-barrier detector telescope (FWHM=90 keV). Measured σ(θ=10°–110°, 5° steps). Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. **1972Sh27** supersedes **1971WaYX** and **1971WaZF**, which report following levels: 0.0, 766, 1862, 3472, 3643, 4162, 4276, 5665 and 6041.
- 1975Mo26:** E=46 MeV proton beam was produced from the Michigan State University Cyclotron. Target was 120 μg/cm² ⁵⁰Cr on a 25 μg/cm² carbon backing. Reaction products were momentum-analyzed with an Enge split-pole magnetic spectrograph and detected with a position-sensitive Si detector (FWHM=8-10 keV) and a single-wire proportional counter (FWHM=35 keV). Measured σ(θ≈5°–50°). Deduced T=2 levels.
- 1969MaZR:** E=40 MeV protons were produced from the Minnesota Linac. Enriched target. Reaction products were momentum-analyzed with a 180° magnetic spectrograph and detected with a solid state detector array. Measured σ(θ). Deduced levels, J, π, L-transfers from DWBA analysis.

⁴⁸Cr Levels

From comparison to other (p,t) work and to γ decay work, there appears to be about a +80 keV calibration error in **1971Br52** for energies above ≈1 MeV and the excitation energies quoted as from **1971Br52** have been so reduced by the evaluators.

E(level) [†]	L [‡]	Comments
0.0	0	L: also from 1971Br52 , 1972Sh27 , 1969MaZR .
750 5	2	E(level): others: 780 30 (1971Br52), 750 20 (1972Sh27), 670 60 (1969MaZR). L: also from 1971Br52 , 1972Sh27 , 1969MaZR .
1630 60		E(level): 1969MaZR report a group at 1630 60 with L=(0,4), which is relatively weak (2% of g.s.) and probably a doublet.
1845 5	4	E(level): others: 1840 30 (1971Br52), 1840 20 (1972Sh27). L: also from 1972Sh27 . Other: L=0 (1971Br52) is discrepant. The σ(θ) in 1971Br52 has much less data points than that of 1972Sh27 and the fit (L=0) appears not as good as that (L=4) in 1972Sh27 .
3150? 60		E(level): from 1969MaZR only.
3420 [‡] 20	(0) [‡]	
3452 [#] 5	(6,5)	E(level): other: 3420 30 (1971Br52).
3527 [#] 5		E(level): others: 3520 30 (1971Br52), 3490 20 (1972Sh27), 3540 60 (1969MaZR).
3630 5	(2,3)	E(level): others: 3620 30 (1971Br52), 3590 20 (1972Sh27). L: from: L=3 (1971Br52), L=2 (1971Do18), and L=(2,3) (1972Sh27).
4067 5	3	E(level): others: 4060 30 (1971Br52), 4050 20 (1972Sh27 , doublet). L: others: L=2+3 for a doublet (1972Sh27); L=4 from 1971Br52 , but it appears not to fit σ(θ) well.
4280 5	0	E(level): others: 4280 30 (1971Br52), 4240 20 (1972Sh27). L: from: L=(0) (1971Do18), L=0 (1971Br52), L=0 (1972Sh27).
4432 5	4	E(level): other: 4440 30 (1971Br52). L: from: L=(4) (1971Do18), L=4 (1971Br52).
4640 10	2	E(level): other: 4640 30 (1971Br52).
5670 [‡] 20	(0) [‡]	
5790 10	4	T=1 E(level): other: 5800 30 (1971Br52).

Continued on next page (footnotes at end of table)

${}^{50}\text{Cr}(\text{p,t})$ 1971Do18,1971Br52,1972Sh27 (continued) ${}^{48}\text{Cr}$ Levels (continued)

<u>E(level)[†]</u>	<u>L[†]</u>	<u>Comments</u>
		L: also from 1971Br52. IAS (${}^{48}\text{V}$ g.s.).
5960 10	(0)	
6100 10	2	T=1 E(level): other: 6100 30 (1971Br52). L: also from 1971Br52. IAS (${}^{48}\text{V}$ 308).
6420 10	(5)	
6855 10	0	
7550 10		E(level): other: 7540 30 (1971Br52).
8750 @ 15	0 @	T=2
8760 @ 15	0 @	T=2 E(level): other: 8780 30 (1971Br52). L: also from 1971Br52.
9040? & 30		
9180? & 30		

[†] From 1971Do18, unless otherwise noted.

[‡] From 1972Sh27. 3.42-MeV state probably not observed by the others due to the differences in incident energies.

Weakly excited state at 3490 20 reported by 1972Sh27 may correspond to either or both of these states.

@ Identified by 1971Do18 as doublet T=2, $J^\pi=0^+$ state. Doublet subsequently resolved by 1975Mo26 who confirmed splitting (10 2 keV) of this T=2 IAS.

& From 1971Br52.