

⁵⁰Ti(p,t) 1972Ko43,1973Ba13,1983Sa29

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

- 1972Ko43:** E=40 MeV proton beam was produced from the Grenoble cyclotron. Target was 800 μg/cm² 69.7% enriched ⁵⁰Ti. Reaction products were detected with two ΔE-E Si telescopes. Measured σ(θ=15° to 65°). Deduced levels, J, π, L-transfers, from DWBA analysis. Comparisons with available data and shell-model calculations.
- 1973Ba13:** E=19, 23, 27 MeV proton beams were produced from the University of Colorado 1.3-m sector-focusing cyclotron. Target was 1.02 mg/cm² 69.7% enriched self-supporting ⁵⁰Ti. Reaction products were detected with ΔE-E counter telescopes of Si surface barrier detectors (ΔE) and Si(Li) detectors (E) (FWHM=70-90 keV). Measured σ(θ_{c.m.}=5° to 55°). Deduced levels, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data. Uncertainty in cross section is 15%.
- 1983Sa29:** E=40.2 MeV proton beam was produced from the Michigan State University sector-focused cyclotron. Reaction products were momentum analyzed with an Enge split-pole magnetic spectrograph (FWHM=17 keV) and detected with a position-sensitive proportional counter and a plastic scintillator. Measured σ(θ_{c.m.}=5° to 55°). Deduced levels, L-transfers, spectroscopic factors from DWBA analysis. Uncertainty in absolute cross section is 10%.
- 1978Ko27:** E=42 MeV proton beam was produced from the Princeton University Cyclotron. Targets were 115 and 80 μg/cm² 83.2% enriched ⁵⁰Ti. Reaction products were momentum-analyzed with the Q3D spectrograph and detected with a proportional counter backed by a plastic scintillator. Measured particle spectra at 21°. Deduced displacement energies of isobaric analog states.

⁴⁸Ti Levels

T: From 1978Ko27.

E(level) [†]	L [#]	(2L+1)σ _{exp} /σ _{DWBA} [@]	Comments
0.0	0	1100	(2L+1)σ _{exp} /σ _{DWBA} : other: 1270 (1983Sa29).
985 3	2	2000	E(level): others: 980 30 (1972Ko43), 983 (1973Ba13, for calibration). (2L+1)σ _{exp} /σ _{DWBA} : other: 1870 (1983Sa29).
2295 3	4	720	E(level): others: 2300 30 (1972Ko43), 2294 10 (1973Ba13). (2L+1)σ _{exp} /σ _{DWBA} : other: 645 (1983Sa29).
2416 3	2	880	E(level): others: 2420 30 (1972Ko43), 2416 10 (1973Ba13). (2L+1)σ _{exp} /σ _{DWBA} : other: 802 (1983Sa29).
2999 3	0	140	E(level): others: 3000 30 (1972Ko43), 3007 10 (1973Ba13). (2L+1)σ _{exp} /σ _{DWBA} : other: 1270 (1983Sa29).
3238 3	4	210	E(level): others: 3240 30 (1972Ko43), 3234 10 (1973Ba13). (2L+1)σ _{exp} /σ _{DWBA} : other: 1320 (1983Sa29).
3333 3	6&	1190&	
3363 3	2&	1190&	E(level): others: 3360 30 (1972Ko43), 3353 10 (1973Ba13). L: other: 3 from 1972Ko43 and 1973Ba13 is inconsistent and could indicate a separate level. (2L+1)σ _{exp} /σ _{DWBA} : other: 900 for L=3 (1973Ba13).
3511 3	6&	630&	E(level): other: 3510 30 (1972Ko43).
3621 3	2&	35&	
3745 3			
3852 3	0	75	E(level): others: 3820 30 (1972Ko43), 3820 20 (1973Ba13). L: from 1973Ba13. Other: (4) (1972Ko43).
4044 3	2		E(level): others: 4050 50 (1972Ko43), 4043 10 (1973Ba13).
4077 3	4&	378&	
4393 3	4&	216&	
4535 3	0&		
4571 10	3	1100	E(level),L: from 1973Ba13. Other: a doublet at 4770 50 possibly with L=0 (1972Ko43).
4589 3	0		E(level): other: 4590 20 (1973Ba13). L: from 1973Ba13. Other: (0),3 from 1983Sa29, probably an unresolved doublet of the 3 ⁻ and 0 ⁺ levels.

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$^{50}\text{Ti}(\text{p,t})$ [1972Ko43](#), [1973Ba13](#), [1983Sa29](#) (continued) ^{48}Ti Levels (continued)

E(level) [†]	J ^π	L [#]	(2L+1)σ _{exp} /σ _{DWBA} [@]	Comments
4725 3		4 ^{&}		
4794 3		3	650	E(level): others: 4790 50 (1972Ko43), 4783 10 (1973Ba13). L: from 1983Sa29 and 1973Ba13 . Other: (4) from 1972Ko43 .
4912 3		5 ^{&}	1870	E(level): others: 4910 50 (1972Ko43), 4920 20 (1973Ba13). L: from 1983Sa29 . Other: 5,6 from 1973Ba13 . (2L+1)σ _{exp} /σ _{DWBA} : for L=5 (1973Ba13). E(level): 1972Ko43 identified level as doublet, possibly with L=0 component.
5000 50				
5160 50		(4)		
5510 50				
6050 50		(4)		
6230 20		(2)	730	E(level),L: from 1973Ba13 .
6650 50		(4)		
6950 50				
7550 50				
7750 50		(4)		
7880 50				
10600 50				
10726? 6	(6 ⁺) [‡]			T=3
10982 6	(4 ⁺) [‡]			T=3
17379 12	(0 ⁺) [‡]			T=4

[†] From [1983Sa29](#) up to 4912 level, from [1972Ko43](#) up to 10600 level and from [1978Ko27](#) levels above 10600 level, unless otherwise noted.

[‡] Suggested analog state ([1978Ko27](#)).

[#] From DWBA analysis of measured σ(θ). Quoted values are from [1972Ko43](#), unless otherwise noted. Values for levels up to 3283 are also from [1973Ba13](#) and [1983Sa29](#).

[@] From [1973Ba13](#), unless otherwise noted.

[&] From [1983Sa29](#).