^{47}Ti(d,p) 1968Wi02,1965Ba07,1964Bj01

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

$J^{\pi}(^{47}\text{Ti g.s.})=5/2^{-}$.

1968Wi02,1965Ba07: E=6 MeV deuterons were produced from the MIT-ONR electrostatic generator. Target was >99% enriched ^{47}Ti. Reaction products were momentum-analyzed with the 24-gap heavy-particle spectrograph (FWHM≈15 keV). Measured $\sigma(\theta_{c.m.}=10^{\circ}$ to $170^{\circ})$. Deduced levels, L transfers, spectroscopic factors from DWBA analysis. 1968Wi02 report the re-analysis of the data from 1965Ba07 employing a deuteron optical potential found in the (d,d) analysis in 1968Wi02. Uncertainty in absolute cross section is 24%. Report 68 levels.

1964Bj01: E=3.0-4.3 MeV deuterons were produced from the University of Copenhagen 4-MeV electrostatic generator. Targets were ≈5 to ≈30 μg/cm^2 thick 99% enriched ^{47}Ti on ≈50 μg/cm^2 carbon backings. Reaction products were momentum-analyzed with a heavy particle spectrograph (FWHM≈0.2%) and detected with photographic plates. Measured spectra at 145.5°. Deduced levels, Q-value. Report 24 levels.

Others:

1961Ha41: E=2.3-4.2 MeV deuterons were produced from the University of Copenhagen electrostatic generator. Reaction products were momentum-analyzed with the heavy-particle spectrograph (FWHM≈0.1%). Measured spectra. Deduced levels. Report 5 levels.

1963Yn01: E=21.4 deuteron beam was produced from the Argonne 60-inch cyclotron. Reaction products were detected with an E-ΔE telescope of NaI(Tl) crystals. Measured $\sigma(\theta_{c.m.}=10^{\circ}$ to $60^{\circ})$. Deduced levels, L-transfers, spectroscopic factors from DWBA analysis. Report 10 levels.

1977To07: E=13.6 deuteron beam was produced from Nuclear Research Institute, Ukrainian SSR. Measured $\sigma(\theta_{c.m.}=0^{\circ}$ to $180^{\circ})$. Deduced levels, L-transfers, spectroscopic factors from DWBA analysis. Report g.s. and 980 levels.

^{48}Ti Levels

Values of dσ/dΩ(max) given under comments are from 1965Ba07.

Spectroscopic factor $C_2S'=[(2J_f+1)/(2J_i+1)]\times C^2S$ quoted in this dataset is obtained from: dσ/dΩ(exp)=N×C_2S'×dσ/dΩ(DWBA), where N is the normalization factor.

E(level)[†‡]	L[@]	C_2S'[@]	Comments
0	&		dσ/dΩ(max)=0.009 mb/sr.
976 *12*	3	1.20 *30*	Additional information 1. E(level): weighted average of 958 *25* (1961Ha41) and 980 *12* (1965Ba07). dσ/dΩ(max)=0.33 mb/sr.
2292 *12*	3	0.33 *9*	Additional information 2. dσ/dΩ(max)=0.085 mb/sr.
2419 *8*	1	0.13 *4*	Additional information 3. E(level): weighted average of 2421 *8* (1964Bj01) and 2416 *12* (1965Ba07). dσ/dΩ(max)=0.34 mb/sr.
3223 *8*	1	0.27 *7*	Additional information 4. E(level): weighted average of 3225 *8* (1964Bj01) and 3219 *12* (1965Ba07). dσ/dΩ(max)=0.54 mb/sr.
3332 *8*	3	0.58 *18*	Additional information 5. E(level): weighted average of 3332 *8* (1964Bj01) and 3331 *12* (1965Ba07). dσ/dΩ(max)=0.18 mb/sr.
3367 *8*	1+3	0.06+<0.04	Additional information 6. E(level): weighted average of 3367 *8* (1964Bj01) and 3367 *12* (1965Ba07). dσ/dΩ(max)=0.16 mb/sr.
3511 *8*	(1)+3	(0.29) *9*	Additional information 7. E(level): weighted average of 3512 *8* (1964Bj01) and 3509 *12* (1965Ba07). C_2S': for L=3. dσ/dΩ(max)=0.10 mb/sr.
3622 *8*	1	0.10 *3*	Additional information 8. E(level): weighted average of 3623 *8* (1964Bj01) and 3620 *12* (1965Ba07).

Continued on next page (footnotes at end of table)

^{47}Ti(d,p) 1968Wi02,1965Ba07,1964Bj01 (continued)

^{48}Ti Levels (continued)

E(level)[†‡]	L[@]	C_2S'[@]	Comments
			dσ/dΩ(max)=0.29 mb/sr.
3703[#] *8*			Additional information 9.
3742 *8*	1+3	(0.02+0.34)	Additional information 10. E(level): weighted average of 3742 *8* (1964Bj01) and 3741 *12* (1965Ba07). dσ/dΩ(max)=0.13 mb/sr.
3785[#] *8*			Additional information 11.
3856[#] *8*			Additional information 12.
4038 *8*	1	0.08 *2*	Additional information 13. E(level): weighted average of 4039 *8* (1964Bj01) and 4036 *12* (1965Ba07). dσ/dΩ(max)=0.30 mb/sr.
4077 *8*	1	0.04 *1*	Additional information 14. E(level): weighted average of 4078 *8* (1964Bj01) and 4075 *12* (1965Ba07). dσ/dΩ(max)=0.13 mb/sr.
4199 *8*			Additional information 15. E(level): weighted average of 4199 *8* (1964Bj01) and 4198 *12* (1965Ba07). dσ/dΩ(max)=0.03 mb/sr.
4312[#] *8*			Additional information 16.
4346[#] *8*			Additional information 17.
4388 *8*	1	0.31 *8*	Additional information 18. E(level): weighted average of 4387 *8* (1964Bj01) and 4390 *12* (1965Ba07). dσ/dΩ(max)=1.14 mb/sr.
4458 *8*	1	0.26 *7*	Additional information 19. E(level): weighted average of 4458 *8* (1964Bj01) and 4457 *12* (1965Ba07). dσ/dΩ(max)=1.28 mb/sr.
4582 *8*	&		Additional information 20. E(level): weighted average of 4583 *8* (1964Bj01) and 4581 *12* (1965Ba07). Doublet (1968Wi02,1965Ba07). dσ/dΩ(max)=0.02 mb/sr.
4719 *8*	1	0.14 *4*	Additional information 21. E(level): weighted average of 4719 *8* (1964Bj01) and 4720 *12* (1965Ba07). dσ/dΩ(max)=0.55 mb/sr.
4789 *8*	1	0.06 *2*	Additional information 22. E(level): weighted average of 4787 *8* (1964Bj01) and 4795 *12* (1965Ba07). dσ/dΩ(max)=0.23 mb/sr.
4852 *8*	1	0.11 *3*	Additional information 23. E(level): weighted average of 4848 *8* (1964Bj01) and 4861 *12* (1965Ba07). dσ/dΩ(max)=0.47 mb/sr.
4914 *12*	1	0.09 *3*	Additional information 24. dσ/dΩ(max)=0.38 mb/sr.
4941 *12*	1	0.06 *2*	Additional information 25. dσ/dΩ(max)=0.19 mb/sr.
5000 *12*	&		Additional information 26. dσ/dΩ(max)=0.02 mb/sr.
5151 *12*	1	0.26 *7*	Additional information 27. dσ/dΩ(max)=0.93 mb/sr.
5255 *12*	&		Additional information 28. dσ/dΩ(max)=0.03 mb/sr.
5303 *12*			Additional information 29. dσ/dΩ(max)=0.075 mb/sr.
5382 *12*	1+3	0.03+0.18	Additional information 30. dσ/dΩ(max)=0.19 mb/sr.
5493 *12*	1+3	(0.01+0.08)	Additional information 31. dσ/dΩ(max)=0.096 mb/sr.
5520 *12*			Additional information 32.

Continued on next page (footnotes at end of table)

^{47}Ti(d,p) 1968Wi02,1965Ba07,1964Bj01 (continued)

^{48}Ti Levels (continued)

E(level)[†‡]	L[@]	C_2S'[@]	Comments
5546 *12*	&		Additional information 33. dσ/dΩ(max)=0.054 mb/sr.
5619 *12*	1	0.11 *3*	Additional information 34. dσ/dΩ(max)=0.54 mb/sr.
5635 *12*	1	0.44 *11*	Additional information 35. dσ/dΩ(max)=2.31 mb/sr.
5763 *12*			Additional information 36.
5888 *12*	1	0.17 *4*	Additional information 37. dσ/dΩ(max)=0.94 mb/sr.
5990 *12*	1+3		S>0.02<0.10 Additional information 38. dσ/dΩ(max)=0.13 mb/sr.
6043 *12*	1	0.22 *6*	Additional information 39. dσ/dΩ(max)=1.05 mb/sr.
6118 *12*			Additional information 40. dσ/dΩ(max)=0.13 mb/sr.
6144 *12*	1	0.02 *1*	Additional information 41. dσ/dΩ(max)=0.12 mb/sr.
6313 *12*	1	0.20 *5*	Additional information 42. dσ/dΩ(max)=1.01 mb/sr.
6362 *12*	1	0.08 *2*	Additional information 43. dσ/dΩ(max)=0.46 mb/sr.
6489 *12*	1+3	0.04+0.42	Additional information 44. dσ/dΩ(max)=0.38 mb/sr.
6628 *12*	1+3	0.03+0.11	Additional information 45. dσ/dΩ(max)=0.14 mb/sr.
6681 *12*	1+3	0.11+0.46	Additional information 46. dσ/dΩ(max)=0.77 mb/sr.
6747 *12*	1+3	0.11+<0.07	Additional information 47. dσ/dΩ(max)=0.40 mb/sr.
7228 *12*	1+3	0.06+<0.08	Additional information 48. dσ/dΩ(max)=0.36 mb/sr.
7252 *12*	1+3	0.03+<0.08	Additional information 49. dσ/dΩ(max)=0.20 mb/sr.
7355 *12*	1	0.16 *4*	Additional information 50. dσ/dΩ(max)=0.74 mb/sr.
7428 *12*	1	0.13 *4*	Additional information 51. dσ/dΩ(max)=0.73 mb/sr.
7478 *12*			Additional information 52. dσ/dΩ(max)=0.10 mb/sr.
7557 *12*			Additional information 53. dσ/dΩ(max)=0.48 mb/sr.
7707 *12*			Additional information 54. dσ/dΩ(max)=0.50 mb/sr.
7757 *12*	1+3	0.08+<0.07	Additional information 55. dσ/dΩ(max)=0.68 mb/sr.
7836 *12*	1+3	0.11+<0.06	Additional information 56. dσ/dΩ(max)=0.76 mb/sr.
7996 *12*	1+3	0.08+0.31	Additional information 57. dσ/dΩ(max)=0.67 mb/sr.
8046 *12*			Additional information 58. dσ/dΩ(max)=0.37 mb/sr.
8086 *12*			Additional information 59. dσ/dΩ(max)=0.52 mb/sr.

Continued on next page (footnotes at end of table)

^{47}Ti(d,p) 1968Wi02,1965Ba07,1964Bj01 (continued)

^{48}Ti Levels (continued)

† Values from 1964Bj01 (also 1961Ha41 from the same lab) are systematically lower by 1 to ≈10 keV than values from 1965Ba07 due to calibration difference of α lines, and should be increased by 0.1% based on the same calibration standard used in 1965Ba07, according to a statement in 1966Do06 in (d,α). 1984Ru06 in (n,γ) point out that E(level) from 1965Ba07 should be decreased by 0.3% to correct for calibration difference based on comparisons of precisely determined excitation energies from their (n,γ) measurements with those from (d,p) in 1965Ba07. Therefore, the values quoted here are taken by the evaluator from the original values decreased by 0.3% for those from 1965Ba07 and decreased by 0.2% for those from 1964Bj01 (also 1961Ha41).

‡ From 1965Ba07 (also in 1968Wi02), unless otherwise noted.

From 1964Bj01 only.

@ From DWBA analysis of measured $\sigma(\theta)$ (1968Wi02,1965Ba07). Quoted values of spectroscopic factors are from re-analysis of data in 1965Ba07 and supersede values from 1965Ba07. $\Delta C^2S'$=25% for L=1 and 25% for L=3 below 3 MeV, 30% for L=3 between 3 and 6 MeV, and 50% for L=3 above 6 MeV (1965Ba07).

& Non-stripping angular distribution (1965Ba07).