

$^{40}\text{Ca}(\text{d,d}'),(\text{pol d,d}') \quad \text{1966Ni02,1968Ha31,1989Ec01}$

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 140, 1 (2017)	30-Sep-2015

Includes (d,d) and (pol d,d).

1966Ni02: E=12.8 MeV deuteron beam was produced from the 120-cm cyclotron of the Institute of Nuclear Physics in Caracow. Reaction products were momentum-analyzed with a broad-range magnetic-ion spectrometer (FWHM=150 keV). Measured $\sigma(\theta)$. Deduced levels, J, π deformation parameters from DWBA analysis.

1968Ha31: E=7.5 MeV deuteron beam was produced from the ONR electrostatic generator. Target was $4.8 \mu\text{g}/\text{cm}^2$ ^{40}Ca evaporated onto thin carbon plus formvar foils. Reaction products were momentum-analyzed with the MIT multi-angle spectragraph. Measured $\sigma(\theta)$, $\theta=22.5^\circ-157.5^\circ$. Deduced levels.

1989Ec01: (pol d, d') E=23.2 MeV polarized deuteron beam was produced from the Munich Lamb-shift source. Reaction products were momentum-analyzed with the Q3D magnetic spectrograph (FWHM=15-20 keV). Measured $\text{Ay}(\theta)$, $\theta=15^\circ-110^\circ$. Deduced levels, J, π , L from DWBA analysis.

Others:

1980Wi12: E=108 MeV. Measured $\sigma(\theta)$, $\theta=4^\circ-20^\circ$.

1989Sa23: E=56 MeV. Measured $\sigma(\theta)$ for 14-MeV level, FWHM=25 keV. Compared (d,d') and (p,p') results.

1992Mo17: (pol d,d') E=400 MeV. Measured $\text{Ay}(\theta)$, deduced spin-transfer parameter (ΔS).

1974PeZW: (d,d') and (pol d,d') E=29 MeV.

(d,d): most references report $\sigma(\theta)$ and deduce optical-model parameters:

1980Im01 (E=4.50-5.43 MeV), **1977An24** (E=1.8-3.0 MeV), **1970Ve02** (E=13.6 MeV), **1970Se01** (E=11.12 MeV), **1970Fi01** (E=11.8 MeV), **1970Bu08** (E=28 MeV), **1970Br27** (E=10 MeV), **1968Le05** (E=5-6.5 MeV), **1968Ga13** (E=28 MeV), **1968Be36** (E=7.0, 7.2 MeV).

(pol d,d): $\text{Ay}(\theta)$ and optical-model parameters:

1998Oh05 (E=270 MeV), **1994Mo21**, **1994Ko47** (E=380 MeV), **1987Ta15** (E=22 MeV), **1987Er03** (E=52 MeV), **1986Ma32** (E=56 MeV), **1985Ng01** (E=700 MeV), **1984Fr14** (E=20 MeV), **1982Cl03** (E=20 MeV), **1982Cl01** (E=18-23 MeV), **1980Ha14** (E=56 MeV), **1977Pe07**, **1974Ro09** and **1974PeZW** (E=30 MeV), **1971Bo44** and **1971Bo39** (E=1.6-3.0 MeV), **1969Sc02** (E=5,7,9,11 MeV).

 ^{40}Ca Levels

E(level) [†]	J π [#]	Γ [@]	L [‡]	B _L ^{&}	Comments
0			0		L: from $\text{Ay}(\theta)$ in 1989Ec01 .
3352 8			0	0.07	L: from 1966Ni02 .
3735 8			3	0.31	L: 1966Ni02 , 1980Wi12 and 1989Ec01 . B _L : other: 0.32 (1968Ha31), 0.21 (1980Wi12 , average of two values for different potentials). $\Delta S=0$ (1992Mo17).
3903 8			2		L: from 1989Ec01 , very weakly populated level in 1966Ni02 .
4480			5	0.15	E(level),L: from 1966Ni02 .
7561					E(level): from 1989Sa23 .
9000					E(level): from 1992Mo17 ; $\Delta S=0$.
13921 15					E(level): from 1989Sa23 and 1992Mo17 ; T=0, $\Delta S=1$.
14.5×10^3 2	0 ⁺ & 2 ⁺	1.5 MeV	2	0+2	E(level),J π ,L: from 1980Wi12 .
15.0×10^3	1 ⁺				E(level),J π : from 1992Mo17 , T=0.
18.2×10^3 5	0 ⁺ & 2 ⁺	4.0 MeV	3	0+2	E(level),J π ,L: from 1980Wi12 .

[†] From **1968Ha31**, unless otherwise stated.

[‡] From DWBA fits to measured differential cross sections (**1966Ni02**, and **1989Ec01**), unless otherwise noted.

[#] From $\text{Ay}(\theta)$ in (pol d,d') (**1989Ec01**, **1992Mo17**).

[@] From **1980Wi12**.

[&] Average of values in **1966Ni02** for two different sets of optical parameters.