^{42}Ca(d,p)   1966Do02,1974Br19,1977Sc05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

Target ^{42}Ca $J^{\pi}=0^{+}$.

1966Do02: E=7.0, 7.1, 7.2 MeV deuteron beam was produced from the MIT-ONR electrostatic generator. Targets of 93.7% enriched CaCO$_3$ on carbon and Formvar foils. Protons were analyzed by a multiple-gap spectrograph (FWHM=12 keV) and detected by nuclear emulsions. Measured $\sigma(\theta)$ from 10° to 180°. A total of 83 groups reported. Deduced levels, L, spectroscopic factors from DWBA analysis.

1974Br19 (also 1971Br14): E=7, 8, 10, 12 MeV deuteron beam was produced at AWRE, Aldermaston. Target of 93.7% enriched CaCO$_3$ on a carbon backing. Protons were analyzed by a multi-gap spectrograph (FWHM=12 keV). Measured $\sigma(\theta)$. Deduced levels, L, spectroscopic factors from DWBA analysis.

1977Sc05: E=2.5 MeV. FWHM=20-25 keV. Measured E(p), $\sigma(\theta)$, deduced ex, L and (2J+1)s for 20 levels up to 5028 keV. DWBA code DWUCK results are given here. Results using code LOLA differ considerably for weakly-populated levels.

Others:

1991NaZZ: E=25 MeV. $\sigma(\theta)$, deduced L-transfers and S- factors for a large number of states up to 9 MeV excitation. Plots of excitation energy and (2J+1)S values are provided for 1d, 2s, 1f, 2p, 1g, 2d and 3s orbitals. No numerical (tabulated) data are available from this work.

1982En06: E=2, 3, 4, 4.5 MeV. Measured $\sigma(\theta)$ for 0, 373 and 593 levels.

1970Br27: E=10, 12 MeV. Measured $\sigma(\theta)$. Deduced L and (2J+1)s for 0, 2040, 2610 and 2940 states.

1968Be36: E=7.0, 7.2 MeV. Measured $\sigma(\theta)$; data for four states at 0, 990, 1899 and 2041 compared with other Ca isotopes.

1968An10: E=9.99 MeV. Measured $\sigma(\theta=35)$. Comparison of 7/2$^-$ g.s. and 3/2$^-$ state strengths amongst Ca isotopes.

1968De04, 1968De09: E=8, 10 MeV. Measured $\sigma(\theta)$. Studied J-dependence for g.s. and 990 transitions in ^{43}Ca and other f-shell nuclides.

1965Be23: E=7.0,7.2 MeV. $\sigma(\theta)$ for g.s. and 374 level.

1957Br19: E=5.0, 6.5, 7.4 MeV. $\theta=90, 130$. A total of 26 proton groups reported up to 3420 keV excitation.

1957Bo99 (also 1957Bp01): E=7 MeV. Measured $\sigma(\theta)$, deduced L, strengths relative to ^{41}Ca g.s. 35 groups reported up to 3584 keV excitation. L-transfers measured for 10 states.

Other: 1964Le02.

Additional information 1.

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        Cross section data at 10 MeV (1974Br19)
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Level	dσ/dΩ (mb/sr) (max)	Level	dσ/dΩ (mb/sr) (max)
0	2.85	3737	0.04 a
373	0.06	3772	0.11
593	1.36	3810	0.08
990	0.29	3864	0.35
1393	0.03	3898	0.02 a
1676	0.03	3916	0.48
1899	0.05	3958	0.07 a
1928	0.02	3978	0.10
1954	2.79	4017	0.09
2041	28.2	4048	0.10
2096	0.04	4089	0.07
2219	0.02	4124	0.06
2246	0.06	4148	0.28
2269	0.06	4196	10.3
2523	0.11	4239	1.41
2607	2.90	4268	0.26
2669	0.06	4298	0.32
2693	0.11	4401	0.3 a
2758	0.15	4460	0.18
2843	0.11	4498	0.15
2874	2.05	4533	0.21
2939	2.10	4638	0.41
3022	0.02	4654	0.21

3045	0.03	4705	0.14
3071	0.30	4897	2.25
3091	0.1 a	4982	0.52
3287	1.34	5008	0.19
3314	0.37	5028	2.59
3352	0.03 a	5047	0.87
3376	0.02 a	5072	0.69
3417	0.16	5100	0.27
3566	2.30	5170	0.29
3604	0.06	5193	0.58
3655	0.05	5215	1.46
3705	0.02 a		

Uncertainties in cross sections=10%.

a: Estimated from plots given by 1966Do02.

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^{43}Ca Levels

E(level)[†]	L[‡]	(2J+1)S[‡]	E(level)[†]	L[‡]	(2J+1)S[‡]	E(level)[†]	L[‡]	(2J+1)S[‡]
0	3	4.5	3314 *10*	1	0.03	4401 *10*		
373[@] *10*	3	3.9	3352 *10*			4429[#] *10*		
593[@] *10*	1	0.16	3376 *10*			4460 *10*	3[b]	0.36[b]
990 *10*	2[a]	0.28[a]	3417 *10*	3	0.19	4498 *10*		
1393 *10*	(2)	0.03	3566 *10*	1	0.19	4533 *10*	0	0.002
1676 *10*			3604 *10*	0	0.001	4585 *10*		
1899 *10*			3655 *10*	(2)	0.01	4609 *10*		
1928 *10*			3705 *10*			4638 *10*	2	0.06
1954 *10*	0	0.10	3737 *10*			4654[&] *10*	0	0.002
2041 *10*	1	2.9	3772 *10*	1	0.01	4705 *10*		
2096 *10*	1	0.04	3783 *10*			4736 *10*		
2219 *10*			3810 *10*	(3)[b]	0.16[b]	4758 *10*		
2246 *10*			3864 *10*	(1)[e]	0.05	4783 *10*		
2269 *10*	(2)	0.01	3898 *10*			4796 *10*		
2404 *10*			3916 *10*	(1,4)[c]	0.04[c]	4826 *10*		
2523 *10*	(1)	0.01	3958 *10*			4854 *10*		
2607 *10*	1	0.28	3978 *10*	2	0.01	4874 *10*		
2669 *10*	3	0.08	4017 *10*			4897 *10*	1	0.14
2693 *10*	2	0.02	4048 *10*	2	0.01	4922 *10*		
2758 *10*	0	0.002	4078 *10*			4944 *10*		
2843 *10*	0	0.001	4089 *10*	(3)	0.08	4982 *10*	2[f]	0.07[f]
2874 *10*	1	0.18	4124 *10*	4	0.19	5008 *10*		
2939 *10*	1	0.19	4148 *10*	0	0.003	5028 *10*	1	0.16
3022 *10*			4196 *10*	1	0.86	5047	1	0.06
3045 *10*			4239 *10*	1	0.10	5072	1	0.04
3071 *10*	0	0.003	4268 *10*	1[d]	0.04	5100	0	0.003
3091 *10*			4298 *10*	0	0.003	5170	2	0.04
3191 *10*			4324[#] *10*			5193	0	0.006
3287 *10*	1	0.12	4370 *10*			5215	0	0.015

[†] From 1966Do02 up to 5028 keV and from 1974Br19 above this energy.

[‡] From 1974Br19, unless otherwise stated.

[#] The existence of this level is considered unlikely by 1978En02.

[@] Principally populated via two-step processes (1982En06).

[&] From 1974Br19.

[a] From 1968Be36.

[b] From 1966Do02.

^{42}Ca(d,p) 1966Do02,1974Br19,1977Sc05 (continued)

^{43}Ca Levels (continued)

^{c} L=4, S=1.19 (1966Do02); but L=(1) in 1974Br19.
^{d} L=1 in 1974Br19 but 2 in 1966Do02.
^{e} 1 (1966Do02).
^{f} L=1, S=0.05 (1966Do02). L=2 in 1974Br19.