

$^{40}\text{Ca}(\text{t},\text{p})$ 1967Bj06,1967Wi15

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen [#] and Balraj Singh		NDS 135, 1 (2016)	31-May-2016

Target ^{40}Ca g.s. $J^\pi=0^+$.

1967Bj06: E=10-12 MeV triton beam was produced at the Aldermaston Tandem generator. A target of CaCO_3 (97% in ^{40}Ca) evaporated onto a carbon film. Reaction products were momentum analyzed with a multi-angle, broad-range magnetic spectrograph and detected in nuclear emulsions, FWHM=15-20 keV. Measured $\sigma(E_p, \theta)$. Deduced levels, J^π , L from DWBA analysis.

1967Wi15: E=7.5 MeV tritons were produced at the Los Alamos Vertical Van de Graaff Accelerator. A natural calcium target.

Protons were detected by a ΔE -E solid-state detector telescope, FWHM=50 keV. Measured $\sigma(\theta)$. A total 28 levels reported, with L values for 19 groups.

1973Ca13: E=20 MeV. FWHM=20 keV. Measured $\sigma(\theta)$. Six L=0 levels reported.

1964Mi06: E=7.2 MeV. Energies and L values of first five levels reported.

Others:

Additional information 1.

1977Is03: E=12 MeV. Measured form factor.

1997Be45: E=28, 33, 37.3 MeV. Measured $\sigma(\theta)$, deduced model parameters.

 ^{42}Ca Levels

Level energy	$d\sigma/d\Omega$ (max) in mb/sr (1967Wi15)	cross section	angle
0	1.45		10.3 °
1523	0.426		28 °
1836	0.135		10.3 °
2423	0.159		28 °
2751	0.201		48 °
3186	0.082		72 °
3253			
3437	0.056		40 °
3651	0.118		28 °
4090	0.02		
4448	0.305		29 °
4757	0.498		27 °
4869	0.345		27 °
5011	0.133		48 °
5201	0.055		35 °
5366			
5471	0.133		48 °
5779	0.08		
5863	1.85		10.3 °
6015	0.573		10.3 °
6106	0.056		46 °
6273			
6518	0.30		15.5 °
6723			
6920	0.437		30 °
7134			
7259	0.08		
7385	0.637		28 °

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$^{40}\text{Ca}(\text{t,p})$ 1967Bj06,1967Wi15 (continued) ^{42}Ca Levels (continued)

<u>E(level)[†]</u>	<u>L[†]</u>	<u>Σ (dσ/dΩ)[#]</u>	<u>Comments</u>
0	0	100 5	
1520 20	2	45 3	E(level): 1523 (1967Wi15).
1840 20	0	14 1	E(level): 1836 (1967Wi15).
2420 20	2	18 1	E(level): 2423 (1967Wi15).
2751 [‡] 4	4	32 2	Additional information 2.
3186 [‡] 6		15 1	Additional information 3. L: 6 assigned by 1967Wi15, but none assigned by 1967Bj06 in their $\sigma(\theta)$ distribution.
3253 [‡] 5		6.7 4	Additional information 4.
3300 20		1.3 2	
3390 20	2	3.2 2	
3438 [‡] 9	3	7.1 4	Additional information 5.
3651 [‡] 6	2	9.3 5	Additional information 6.
3880 20		2.2 1	
3950 20		1.6 2	
4000 20		0.8 1	
4050 20		1.2 2	
4091 [‡] 8		5.8 3	Additional information 7.
4230 20		0.8 1	
4350 20		1.3 2	
4448 [‡] 11	2	32 2	Additional information 8.
4500 20		0.8 1	
4560 20		0.9 1	
4680 20	3	7.0 4	
4710 20		1.0 3	
4756 [‡] 9	2	43 2	Additional information 9.
4868 [‡] 7	2	28 1	Additional information 10.
4900 20		4.8 7	
4960 20	2,3	2.7 2	
5011 [‡] 7	4	20 1	Additional information 11.
5070 20			
5150 20			
5200 [‡] 5	2	10 1	Additional information 12.
5320 20			
5363 [‡] 9		9@ 2	Additional information 13.
5370 20		9@ 2	
5410 20			
5469 [‡] 9		21 3	Additional information 14. L: 4 assigned by 1967Wi15, but none assigned by 1967Bj06 in their $\sigma(\theta)$ distribution.
5520 20			
5580 20			
5610 20		8 1	
5660 20			
5700 20			
5775 [‡] 11		28& 2	Additional information 15.
5790 20		28& 2	
5860 [‡] 10	0	97 5	Additional information 16.
5920 20			
5980 20			
6014 [‡] 9	0	25 1	Additional information 17.
6105 [‡] 7	4	12 1	Additional information 18.
6150 20			
6170 20			

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$^{40}\text{Ca}(\text{t,p})$ [1967Bj06,1967Wi15](#) (continued) ^{42}Ca Levels (continued)

<u>E(level)[†]</u>	<u>L[†]</u>	<u>Σ (dσ/dΩ)[#]</u>	<u>Comments</u>
6200 ²⁰			
6273 [‡] 7	2	17 2	Additional information 19.
6290 ²⁰			
6400 ²⁰			
6450 ²⁰		9.5 1	
6517 [‡] 8	(0)	30 2	Additional information 20.
6600 ²⁰			
6640 ²⁰			
6720 [‡] 8	0	28 2	Additional information 21.
6730 ²⁰			
6800 ²⁰			
6820 ²⁰		23 12	
6880 ²⁰		52 ^a 3	
6920 [‡] 4		52 ^a 3	Additional information 22. L: 2 assigned by 1967Wi15 for a 6920 group, but none assigned by 1967Bj06 in their $\sigma(\theta)$ distribution for 6880+6910+6940.
6940 ²⁰		52 ^a 3	
7010 ²⁰		11 1	
7110 ²⁰		40 ^b 2	E(level): 7134 8 (1967Wi15).
7130 ²⁰		40 ^b 2	
7180 ²⁰	2	11 2	
7257 [‡] 7		18 1	Additional information 23.
7280 ²⁰			
7320 ²⁰			
7384 [‡] 5		78 4	L: 2 assigned by 1967Wi15 , but none assigned by 1967Bj06 in their $\sigma(\theta)$ distribution. Additional information 24.

[†] From [1967Bj06](#). Level energies are adopted from [1967Bj06](#) due to better resolution (15-20 keV) than in [1967Wi15](#) (50 keV), unless otherwise noted.

[‡] Weighted average from [1967Bj06](#) and [1967Wi15](#).

[#] Summed over 24 angles. Values are in arbitrary units ([1967Bj06](#)).

@ For 5350+5370.

& For 5760+5790.

^a For 6880+6910+6940.

^b For 7110+7130.