^{40}Ca(α,^{2}He) 1990Fi07,1980Va17

History

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

1990Fi07: E=55.7 MeV α beam was produced at the Bonn isochroneous cyclotron. A target of ^{40}Ca enriched to 99.8%. 2He is detected by measuring the two breakup protons in coincidence with a pair of vertically arranged ΔE-E detector telescopes, FWHM=200-300 keV. Measured $\sigma(\theta)$. Deduced levels, J^{π}, L from DWBA analysis.

1980Va17: E=65 MeV α beam was produced at the AVF cyclotron of the KVI. A solid and self-supporting target of ^{40}Ca. Break-up protons from the outgoing 2He were detected with two ΔE-E solid-state counter telescopes. Measured $\sigma(\theta)$. Deduced level, J^{π}, L from DWBA analysis.

1978Ja10 (also 1978Ja22, 1980StZO): E=55 MeV. Measured pp coin, $\sigma(\theta)$. Deduced reaction mechanism. 6^{+} state at 3190 is the most intensely populated state, whereas 0, 1530, 2750, 7400 and 9040 are very weak in the spectrum shown by 1978Ja10.

^{42}Ca Levels

E(level)[†]	L[†]	Normalization constant N[†]	Comments
0[#]	0	260 *20*	N=410 *200* (1980Va17).
1530[#] *50*	2	260 *20*	
2750[#] *50*	4	180 *15*	N=160 *40* (1980Va17).
3190[#] *50*	6	120 *5*	N=140 *40* (1980Va17).
3660 *70*	2		E(level),L: from 1980Va17. N=350 *200* for $\nu f^2_{7/2}$, 43 *20* for $\nu f_{7/2}p_{3/2}$, 60 *30* for $\nu p^2_{3/2}$ (1980Va17).
4830[&] *50*	4	30 *4*	E(level): 5010 *70* (1980Va17). N=190 *70* for $\nu f^2_{7/2}$, 28 *8* for $\nu f_{7/2}p_{3/2}$, 190 *70* for $\nu f_{7/2}\nu f_{5/2}$ (1980Va17).
5380[@] *50*	6	9 *1*	
7280[@] *50*	6	6 *1*	E(level): 7400 (1978Ja10), 7510 *50* (1980Va17). L: in 1980Va17, L=6 fits well, but L=5 and 7 cannot be discarded. N(for L=6)=70 *20* for $\nu f^2_{7/2}$, 17 *6* for $\nu f_{7/2}\nu f_{5/2}$ (1980Va17).
8810 *50*	[‡]		
9080 *50*	6,7,8[‡]		E(level): 9040 (1978Ja10), 9111 *50* (1980Va17). L: from 1980Va17, L=6 is less probable. N(for L=6)=80 *30* for $\nu f^2_{7/2}$, 18 *5* for $\nu f_{7/2}\nu f_{5/2}$. N(for L=7)=34 *7* for $\nu f_{7/2}g_{9/2}$. N(for L=8)=6 *2* for $\nu g^2_{9/2}$ (1980Va17).
9330 *50*	[‡]		
9600 *50*	5,6[‡]		E(level): 9510 *50* (1980Va17). L: from 1980Va17, L=5 fits slightly better than L=6. N(for L=5)=18 *4* for $\nu f_{7/2}\nu g_{9/2}$, 65 *10* for $\nu p_{3/2}\nu g_{9/2}$. N(for L=6)=30 *6* for $\nu f_{7/2}\nu f_{5/2}$ (1980Va17).
9870 *50*	6,7,8[‡]		E(level): 9990 *50* (1980Va17). L: from 1980Va17, L=6 is less probable. N(for L=6)=18 *4* for $\nu f_{7/2}\nu f_{5/2}$. N(for L=7)=32 *6* for $\nu f_{7/2}g_{9/2}$. N(for L=8)=6 *2* for $\nu g^2_{9/2}$ (1980Va17).
10160 *50*	[‡]		

[†] From 1990Fi07, unless otherwise stated. N=[dσ/dΩ](exp)/[dσ/dΩ](DWBA).
[‡] L≥5 (1990Fi07).
[#] Member of $\nu f^2_{7/2}$ multiplet.

Continued on next page (footnotes at end of table)

^{40}Ca(α,^{2}He) 1990Fi07,1980Va17 (continued)

^{42}Ca Levels (continued)

@ Member of $\nu f_{7/2} \otimes \nu f_{5/2}$ multiplet.
& Configuration=$\nu f_{7/2} \otimes \nu p_{3/2}$.