^{76}Ge(^{3}He,t) 2012Th06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Jun Chen and Ameenah R. Farhan	NDS 194,3 (2024)	8-Jan-2024

2012Th06: ^{3}He beam at E=183 MeV accelerated using the Azimuthally Varying Field (AVF) Cyclotron in combination with the Ring Cyclotron. Target=1.43 *4* mg/cm^2 ^{76}Ge (86% enriched). FWHM≈30 keV. Measured outgoing tritons using the Grand Raiden Spectrometer (GRS), dσ/dΩ, $\sigma(\theta)$ at five angles. Deduced B(GT) strengths. Experiment was performed at the Research Center for Nuclear Physics (RCNP), Osaka University.

2017Fr02: E=420 MeV ^{3}He beam was produced at the Research Center for Nuclear Physics (RCNP). Tritons were detected and measured with the Grand Raiden Spectrometer (FWHM=30-40 keV). Measured σ(E,θ). Deduced levels, relative strengths. Comparisons with shell-model calculations.

Analysis of data: 2012Sa38, 2016Ej02.

^{76}As Levels

E(level)[†]	J$^\pi$[‡]	L	B(GT)[†]	Comments
0	2$^-$[@]	1+3		L: from DWBA fit to measured differential cross section (2017Fr02). dσ/dΩ(q$_{max}$)=0.40 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=1.8 fm^2 (2017Fr02).
86 *1*	1$^+$		0.120 *13*	dσ/dΩ=1.173 mb/sr *19*.
120 *1*	1$^+$		0.033 *3*	dσ/dΩ=0.318 mb/sr *7*.
265 *1*	1$^+$		0.010 *2*	dσ/dΩ=0.113 mb/sr *3*.
363 *1*	2$^-$[@]			dσ/dΩ(q$_{max}$)=0.064 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.28 fm^2 (2017Fr02).
≈500[#&]	(2$^-$,1$^+$)[#@]	&	0.045 *16*	dσ/dΩ=0.621 mb/sr *10*. dσ/dΩ(q$_{max}$)=0.13 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.58 fm^2 (2017Fr02).
628[#] *1*	[2$^-$,3$^+$][#]		0.001 *2*	dσ/dΩ=0.039 mb/sr *1*.
744[#] *1*	[1$^+$,3$^+$][#]		0.002 *3*	dσ/dΩ=0.059 mb/sr *1*.
774[#] *1*	[1$^+$,3$^+$][#]		0.002 *3*	dσ/dΩ=0.067 mb/sr *2*.
864 *1*	1$^+$		0.025 *5*	dσ/dΩ=0.284 mb/sr *7*.
936 *1*	1$^+$		0.018 *4*	dσ/dΩ=0.209 mb/sr *5*.
1022[#] *1*	[1$^+$,3$^+$][#]		0.018 *8*	dσ/dΩ=0.275 mb/sr *4*.
1063 *1*	1$^+$		0.136 *9*	dσ/dΩ=1.230 mb/sr *20*.
1098 *1*	1$^+$		0.015 *2*	dσ/dΩ=0.157 mb/sr *4*.
1157 *1*	1$^+$		0.056 *3*	dσ/dΩ=0.495 mb/sr *10*.
1235 *1*	1$^+$		0.028 *5*	dσ/dΩ=0.298 mb/sr *6*.
1353 *1*	1$^+$		0.062 *7*	dσ/dΩ=0.615 mb/sr *11*.
1475 *1*	1$^+$		0.021 *6*	dσ/dΩ=0.260 mb/sr *5*.
1540[#] *1*	[1$^+$,3$^+$][#]		0.003 *3*	dσ/dΩ=0.069 mb/sr *2*.
1573[#&] *1*	(2$^-$)[#@]	&	0.009 *1*	dσ/dΩ=0.071 mb/sr *2*. dσ/dΩ(q$_{max}$)=0.024 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.1 fm^2 (2017Fr02).
1637[#] *1*	[1$^+$,2$^-$][#]		0.003 *4*	dσ/dΩ=0.099 mb/sr *2*. E(level): mixed with ^{74}As 2$^-$ g.s.
1693 *1*	1$^+$		0.049 *3*	dσ/dΩ=0.451 mb/sr *9*.
1718 *1*	1$^+$		0.013 *4*	dσ/dΩ=0.125 mb/sr *3*.
1792 *1*	1$^+$		0.013 *4*	dσ/dΩ=0.159 mb/sr *3*.
1852 *1*	1$^+$		0.033 *4*	dσ/dΩ=0.326 mb/sr *6*.
1902 *1*	1$^+$		0.045 *1*	dσ/dΩ=0.379 mb/sr *9*.
1929[#&] *1*	(2$^-$)[#@]	&	0.004 *1*	dσ/dΩ=0.044 mb/sr *1*. dσ/dΩ(q$_{max}$)=0.016 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.07 fm^2 (2017Fr02).

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^{76}Ge(^{3}He,t) 2012Th06 (continued)

^{76}As Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	L	B(GT)[†]	Comments
1987 *1*	1$^+$		0.010 *1*	dσ/dΩ=0.094 mb/sr *2*.
2041 *1*	1$^+$		0.006 *1*	dσ/dΩ=0.053 mb/sr *2*.
2154 *1*	1$^+$		0.012 *2*	E(level): mixed with ^{74}As 1$^+$ state at 513.8 keV. dσ/dΩ=0.125 mb/sr *3*.
2338 *1*	1$^+$		0.019 *2*	dσ/dΩ=0.184 mb/sr *4*.
2449 *1*	1$^+$		0.009 *2*	dσ/dΩ=0.111 mb/sr *3*.
2537 *1*	1$^+$		0.041 *3*	dσ/dΩ=0.377 mb/sr *7*.
2604 *1*	1$^+$		0.033 *5*	dσ/dΩ=0.347 mb/sr *7*.
2657 *1*	1$^+$		0.008 *2*	dσ/dΩ=0.096 mb/sr *2*.
2688 *1*	1$^+$		0.013 *1*	dσ/dΩ=0.122 mb/sr *3*.
2716 *1*	1$^+$		0.009 *3*	dσ/dΩ=0.126 mb/sr *3*.
2763 *1*	1$^+$		0.008 *2*	dσ/dΩ=0.099 mb/sr *2*.
2791 *1*	1$^+$		0.014 *1*	dσ/dΩ=0.133 mb/sr *3*.
2819 *1*	1$^+$		0.004 *2*	dσ/dΩ=0.069 mb/sr *2*.
2882 *1*	1$^+$		0.020 *2*	dσ/dΩ=0.193 mb/sr *4*.
2918 *1*	1$^+$		0.011 *1*	dσ/dΩ=0.107 mb/sr *3*.
2940 *1*	1$^+$		0.037 *3*	dσ/dΩ=0.354 mb/sr *7*.
3024 *1*	1$^+$		0.026 *2*	dσ/dΩ=0.238 mb/sr *5*.
3134[#&] *1*	(2$^-$)[#@]	&	0.012 *1*	dσ/dΩ=0.120 mb/sr *3*. dσ/dΩ(q$_{max}$)=0.022 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.1 fm^2 (2017Fr02).
3190[#&] *1*	(2$^-$)[#@]	&	0.027 *2*	dσ/dΩ=0.254 mb/sr *5*. dσ/dΩ(q$_{max}$)=0.03 mb/sr (2017Fr02). Relative spin-dipole M2 transition strength=0.13 fm^2 (2017Fr02).
3257 *1*	1$^+$		0.009 *2*	dσ/dΩ=0.097 mb/sr *2*.
3364[#] *1*	[1$^+$,2$^-$][#]		0.006 *2*	dσ/dΩ=0.070 mb/sr *2*.
3426 *1*	2$^-$			
3482 *1*	1$^+$		0.011 *1*	dσ/dΩ=0.107 mb/sr *3*.
3504 *1*	1$^+$		0.007 *1*	dσ/dΩ=0.062 mb/sr *3*.
3540 *1*	1$^+$		0.025 *2*	dσ/dΩ=0.230 mb/sr *5*.
3589 *1*	1$^+$		0.048 *2*	dσ/dΩ=0.421 mb/sr *9*.
3634 *1*	1$^+$		0.011 *1*	dσ/dΩ=0.106 mb/sr *3*.
3695 *1*	1$^+$		0.024 *2*	dσ/dΩ=0.227 mb/sr *5*.
3798 *1*	1$^+$		0.021 *1*	dσ/dΩ=0.181 mb/sr *5*.
3848 *1*	1$^+$		0.053 *1*	dσ/dΩ=0.441 mb/sr *10*.
3932 *1*	1$^+$		0.022 *1*	dσ/dΩ=0.186 mb/sr *5*.
4034 *1*	1$^+$		0.013 *1*	dσ/dΩ=0.119 mb/sr *3*.
4071 *1*	1$^+$		0.027 *1*	dσ/dΩ=0.239 mb/sr *6*.
4109 *1*	1$^+$		0.004 *1*	dσ/dΩ=0.052 mb/sr *1*.
4179 *1*	1$^+$		0.012 *1*	dσ/dΩ=0.103 mb/sr *3*.
4218 *1*	1$^+$		0.014 *1*	dσ/dΩ=0.116 mb/sr *4*.
4268 *1*	1$^+$		0.034 *1*	dσ/dΩ=0.294 mb/sr *7*.
4306 *1*	1$^+$		0.021 *1*	dσ/dΩ=0.187 mb/sr *4*.
4466 *1*	1$^+$		0.010 *1*	dσ/dΩ=0.094 mb/sr *3*.
4499 *1*	1$^+$		0.019 *1*	dσ/dΩ=0.167 mb/sr *4*.
4536 *1*	1$^+$		0.006 *1*	dσ/dΩ=0.055 mb/sr *2*.
4668 *1*	1$^+$		0.004 *1*	dσ/dΩ=0.046 mb/sr *1*.
4699 *1*	1$^+$		0.019 *1*	dσ/dΩ=0.153 mb/sr *6*.
4738 *1*	1$^+$		0.016 *1*	dσ/dΩ=0.137 mb/sr *4*.
4801 *1*	1$^+$		0.030 *1*	dσ/dΩ=0.261 mb/sr *6*.
4841 *1*	1$^+$		0.028 *1*	dσ/dΩ=0.234 mb/sr *6*.
4941 *1*	1$^+$		0.012 *1*	dσ/dΩ=0.101 mb/sr *3*.
4978 *1*	1$^+$		0.016 *1*	dσ/dΩ=0.151 mb/sr *4*.

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^{76}Ge(^{3}He,t) 2012Th06 (continued)

^{76}As Levels (continued)

† From 2012Th06.
‡ From $\sigma(\theta)$ data (2012Th06).
# The spin assignments in square brackets indicate the presence of two closely spaced and unresolved states of different spins (2012Th06).
@ Measured angular distributions in 2017Fr02 indicate that the (^{3}He,t) charge-exchange reaction populates $J^{\pi}=2^{-}$ final state. See also comment from 2012Th06 about this level being a doublet with $J^{\pi}=[1^{+},2^{-}]$.
& Very weak unresolved 2^{-} states with strengths extracted by a multipole decomposition of two major components $\Delta L=0$ and $\Delta L=1$ (2017Fr02).