^{82}Se(^{3}He,t) 2016Fr06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. K. Tuli, E. Browne	NDS 157, 260 (2019)	1-Mar-2019

Based on XUNDL, compiled dataset from 2016Fr06 by G. Gürdal (SUNY Old Westbury College); November 01, 2016; and from 2017Fr02 by J. Chen (NSCL/MSU), April 30, 2017.

2016Fr06: ^{3}He beam was accelerated to 420 MeV using the Azimuthally Varying Field Cyclotron in combination with the Ring Cyclotron at Research Center for Nuclear Physics at Osaka University and impinged on a thin 1.75 mg/cm^2 *5*, 97.43 % *2* enriched ^{82}Se target evaporated on a 150 μg carbon backing. The outgoing reaction tritons were momentum analyzed in the Grand Raiden Spectrometer. Measured: E_t, level energies and t(θ). Determined: Isobaric analog state (IAS), charge-exchange reaction cross sections dσ/dΩ extrapolated to q=0, Gamow-Teller (G-T) fraction and G-T strength distributions (B(G-T)). Distorted-wave calculations. ^{82}Se(ν_e,e$^-$)^{82}Br was studied and solar neutrino capture rate in a nonoscillation scenario was evaluated as 668 *12*(stat) *60* (sys) from B(G-T) values of excitation energies in ^{82}Br.

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.

All are data from 2016Fr06, unless given otherwise.

^{82}Br Levels

G-T resonance appears around 12100 keV with a width of 5000 keV.

The uncertainty in B(G-T) values include an extra 50% contribution from the non-G-T part of the cross section at q=0. The integrated B(G-T) strength from the analysis of the individual states up to 6000 keV excitation yields was determined as 1.98 *4*. The uncertainty in B(G-T) is statistical only.

E(level)	J$^\pi$[‡]	dσ/dΩ (q=0) (mb/sr)[†@]	Comments
75 *2*	1$^+$	3.009 *52*	G-T = 82%; B(G-T) = 0.338 *31*.
362 *2*	3$^+$		
421 *2*	1$^+$	0.116 *15*	G-T = 86%; B(G-T) = 0.014 *2*.
543 *2*	2$^-$		2017Fr02: L=1+3; dσ/dΩ(q$_{max}$)=0.30 mb/sr; relative spin-dipole transition strength K$_\sigma$(M2) in units of fm^2=1.54.
642 *2*	3$^+$		
764 *2*	2$^-$		2017Fr02: dσ/dΩ(q$_{max}$)=0.16 mb/sr; relative spin-dipole transition strength K$_\sigma$(M2) in units of fm^2=0.84.
848 *2*	1$^+$	0.030 *1*	G-T = 14%; B(G-T) = 0.0010 *5*.
1142 *2*	1$^+$	0.173 *4*	G-T = 28%; B(G-T) = 0.007 *3*.
1233 *2*	1$^+$	0.140 *4*	G-T = 68%; B(G-T) = 0.013 *2*.
1378 *2*	1$^+$	0.055 *1*	G-T = 87%; B(G-T) = 0.0070 *4*.
1484 *2*	1$^+$	0.567 *9*	G-T = 46%; B(G-T) = 0.036 *10*.
1680 *2*	2$^-$		2017Fr02: dσ/dΩ(q$_{max}$)=0.041 mb/sr; relative spin-dipole transition strength K$_\sigma$(M2) in units of fm^2=0.21.
1766 *2*	(2$^-$)[#]	0.106 *2*	2016Fr06: J=1$^+$,2$^-$; G-T = 75%; B(G-T) = 0.011 *1*. 2017Fr02: J=2$^-$; dσ/dΩ(q$_{max}$)=0.05 mb/sr; relative spin-dipole transition strength K$_\sigma$(M2) in units of fm^2=0.26.
1958 *2*	1$^+$	0.100 *2*	G-T = 74%; B(G-T) = 0.010 *1*.
2087 *2*	1$^+$	1.366 *4*	G-T = 77%; B(G-T) = 0.149 *17*.
2136 *2*	1$^+$	0.258 *6*	G-T = 72%; B(G-T) = 0.026 *4*.
2213 *2*	(1$^+$,2$^-$)[#]	0.403 *9*	G-T = 90%; B(G-T) = 0.051 *3*.
2272 *2*	1$^+$	0.315 *9*	G-T = 55%; B(G-T) = 0.024 *5*.
2317 *2*	1$^+$	0.247 *7*	G-T = 21%; B(G-T) = 0.007 *3*.
2351 *2*	1$^+$	0.227 *4*	G-T = 67%; B(G-T) = 0.021 *4*.
2498 *2*	1$^+$	0.162 *3*	G-T = 73%; B(G-T) = 0.017 *2*.
2543 *2*	3$^+$		

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^{82}Se(^{3}He,t) 2016Fr06 (continued)

^{82}Br Levels (continued)

E(level)	J^{π}‡	dσ/dΩ (q=0) (mb/sr)†@	Comments
2712 *2*	1^+	0.068 *1*	G-T = 58%; B(G-T) = 0.006 *1*.
2801 *2*	1^+	0.154 *3*	G-T = 87%; B(G-T) = 0.019 *1*.
2876 *2*	1^+	0.185 *4*	G-T = 72%; B(G-T) = 0.019 *3*.
2940 *2*	1^+	0.412 *7*	G-T = 84%; B(G-T) = 0.049 *4*.
3028 *2*	1^+	0.092 *2*	G-T = 74%; B(G-T) = 0.010 *1*.
3062 *2*	1^+	0.126 *3*	G-T = 78%; B(G-T) = 0.014 *2*.
3097 *2*	3^+		
3172 *2*	1^+	0.137 *3*	G-T = 79%; B(G-T) = 0.015 *2*.
3256 *2*	1^+	0.098 *2*	G-T = 82%; B(G-T) = 0.011 *1*.
3296 *2*	1^+	0.046 *1*	G-T = 39%; B(G-T) = 0.003 *1*.
3333 *2*	1^+	0.140 *3*	G-T = 81%; B(G-T) = 0.016 *2*.
3420 *2*	1^+	0.167 *4*	G-T = 88%; B(G-T) = 0.020 *1*.
3455 *2*	1^+	0.142 *4*	G-T = 96%; B(G-T) = 0.019 *1*.
3507 *2*	3^+		
3579 *2*	1^+	0.125 *3*	G-T = 90%; B(G-T) = 0.016 *1*.
3623 *2*	1^+	0.066 *2*	G-T = 65%; B(G-T) = 0.006 *1*.
3688 *2*	$(1^+,2^-)$#	0.050 *1*	G-T = 55%; B(G-T) = 0.004 *1*.
3720 *2*	1^+	0.135 *3*	G-T = 83%; B(G-T) = 0.016 *1*.
3788 *2*	1^+	0.125 *3*	G-T = 91%; B(G-T) = 0.016 *1*.
3856 *2*	1^+	0.095 *2*	G-T = 85%; B(G-T) = 0.011 *1*.
3951 *2*	1^+	0.091 *2*	G-T = 67%; B(G-T) = 0.009 *2*.
4033 *2*	1^+	0.35 *7*	G-T = 94%; B(G-T) = 0.046 *9*.
4099 *2*	1^+	0.250 *6*	G-T = 91%; B(G-T) = 0.032 *2*.
4170 *2*	1^+	0.373 *8*	G-T = 94%; B(G-T) = 0.049 *2*.
4209 *2*	1^+	0.267 *6*	G-T = 98%; B(G-T) = 0.037 *1*.
4272 *2*	1^+	0.230 *5*	G-T = 92%; B(G-T) = 0.030 *1*.
4317 *2*	1^+	0.131 *3*	G-T = 99%; B(G-T) = 0.018 *1*.
4365 *2*	1^+	0.112 *3*	G-T = 94%; B(G-T) = 0.015 *1*.
4391 *2*	1^+	0.120 *3*	G-T = 100%; B(G-T) = 0.017 *1*.
4433 *2*	1^+	0.110 *3*	G-T = 88%; B(G-T) = 0.013 *1*.
4511 *2*	1^+	0.086 *3*	G-T = 99%; B(G-T) = 0.012 *1*.
4554 *2*	$(1^+,2^-)$#	0.101 *2*	G-T = 96%; B(G-T) = 0.014 *1*.
4601 *2*	1^+	0.141 *4*	G-T = 92%; B(G-T) = 0.018 *1*.
4632 *2*	1^+	0.157 *4*	G-T = 88%; B(G-T) = 0.019 *1*.
4689 *2*	$(1^+,2^-)$#	0.106 *3*	G-T = 93%; B(G-T) = 0.014 *1*.
4772 *2*	1^+	0.243 *6*	G-T = 98%; B(G-T) = 0.033 *1*.
4779 *2*	2^-		
4869 *2*	1^+	0.088 *2*	G-T = 85%; B(G-T) = 0.010 *1*.
4910 *2*	1^+	0.136 *4*	G-T = 93%; B(G-T) = 0.018 *1*.
4971 *2*	1^+	0.206 *5*	G-T = 92%; B(G-T) = 0.026 *1*.
5008 *2*	1^+	0.235 *6*	G-T = 97%; B(G-T) = 0.032 *1*.
5066 *2*	1^+	0.176 *4*	G-T = 88%; B(G-T) = 0.022 *1*.
5110 *2*	1^+	0.224 *8*	G-T = 98%; B(G-T) = 0.031 *1*.
5211 *2*	1^+	0.129 *3*	G-T = 91%; B(G-T) = 0.016 *1*.
5250 *2*	1^+	0.126 *4*	G-T = 100%; B(G-T) = 0.017 *1*.
5279 *2*	1^+	0.244 *6*	G-T = 97%; B(G-T) = 0.033 *1*.
5326 *2*	1^+	0.186 *4*	G-T = 94%; B(G-T) = 0.024 *1*.
5371 *2*	1^+	0.189 *5*	G-T = 99%; B(G-T) = 0.026 *1*.
5416 *2*	1^+	0.168 *4*	G-T = 95%; B(G-T) = 0.022 *1*.
5446 *2*	1^+	0.219 *5*	G-T = 97%; B(G-T) = 0.029 *1*.
5491 *2*	1^+	0.162 *5*	G-T = 100%; B(G-T) = 0.023 *1*.
5519 *2*	1^+	0.086 *3*	G-T = 97%; B(G-T) = 0.012 *1*.
5571 *2*	1^+	0.170 *4*	G-T = 95%; B(G-T) = 0.023 *1*.
5614 *2*	1^+	0.124 *5*	G-T = 100%; B(G-T) = 0.017 *1*.
5641 *2*	1^+	0.185 *5*	G-T = 100%; B(G-T) = 0.026 *1*.

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^{82}Se(^{3}He,t) 2016Fr06 (continued)

^{82}Br Levels (continued)

E(level)	J^{π}‡	dσ/dΩ (q=0) (mb/sr)†@	Comments
5671 *2*	1^+	0.222 *7*	G-T = 100%; B(G-T) = 0.031 *1*.
5712 *2*	$(1^+,2^-)$#	0.117 *4*	G-tT = 99%; B(G-T) = 0.016 *1*.
5727 *2*	1^+	0.143 *4*	G-T = 100%; B(G-T) = 0.020 *1*.
5761 *2*	1^+	0.197 *5*	G-T = 98%; B(G-T) = 0.027 *1*.
5810 *2*	$(1^+,2^-)$#	0.153 *4*	G-T = 99%; B(G-T) = 0.021 *1*.
5866 *2*	1^+	0.224 *5*	G-T = 93%; B(G-T) = 0.029 *1*.
5908 *2*	1^+	0.124 *3*	G-T = 91%; B(G-T) = 0.016 *1*.
5947 *2*	1^+	0.217 *5*	G-T = 97%; B(G-T) = 0.029 *1*.
9676 *2*			IAS.

† Quoted values are for relative spin-dipole transition strength K_{σ}(M2) in units of fm^2.
‡ From angular distribution measurements.
# Could not be assigned one value due to closely spaced and unresolved states with different spins.
@ Δ(dσ/dΩ) statistical only.