^{1}H(^{56}Ni,N) 2011Sa52,2012Sa37

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	25-Mar-2022

2012Sa37, 2011Sa52: ^{1}H(^{56}Ni,n)^{56}Cu charge exchange reaction. Beam=^{56}Ni, and target=liquid hydrogen 60 mg/cm^2 placed 65 cm from the pivot point of S800 spectrograph at NSCL facility. ^{56}Ni secondary beam at 110 MeV/nucleon produced in fragmentation of E=160 MeV/nucleon ^{58}Ni beam with ^{9}Be target at NSCL facility. Reaction products were separated by A1900 fragment separator. Ion identification by time-of-flight and energy loss information in a Si detector. Measured neutron spectrum using LENDA array of 24 plastic scintillators in singles and coincidence with ^{56}Cu and ^{55}Ni ions. Angular distributions were measured up to 20° in c.m. system. Resolution varied from 1 MeV at θ(c.m.)=2° to 2.2 MeV at 20°. The data were grouped in energy bins of 0.5 MeV and scattering angle bin of 2°(c.m.) wide. Absolute cross sections accurate to 10%. Deduced Gamow-Teller strengths from cross sections. DWIA analysis of $\sigma(\theta)$ data. ^{56}Cu excitation spectrum measured up to 16 MeV. Comparison of deduced Gamow-Teller strengths with calculations using KB3G and GXPF1A interactions. For ^{56}Cu excitation energy region of 1-6 MeV, all the yield is due to Gamow-Teller transitions, the strength extracted experimentally from events associated with ^{56}Cu and ^{55}Ni residuals, the latter from the proton decay of excited states in ^{56}Cu. In the 1-6 MeV excitation energy region, two peaks structures were at 3 and 5 MeV. 7/2$^-$ g.s. to 7/2$^-$ g.s. excitation in ^{1}H(^{55}Co,n)^{55}Ni reaction was used for calibration purpose, with its angular distribution measured for this transition in ^{55}Ni.

^{56}Cu Levels

Integrated experimental B(GT) strength=3.5 *3*(stat) *10*(syst) (2011Sa52).

E(level)†	J$^\pi$	L‡	Comments
<1×10^3		2	E(level): excitation energy below the proton-decay threshold.
5×10^3 *3*	1$^+$	0	σ(GT)=3.2 mb/sr *5* (2011Sa52). E(level): two peaks at 2.8 and 4.8 MeV are visible in this energy range from Fig. 2e in 2011Sa52. J$^\pi$: from 2011Sa52, L=0, Gamow-Teller transition.
12×10^3 *3*		1	Events associated with ^{54}Co (from 2p decay of ^{56}Cu) are also present in this region above ≈10 MeV excitation.

† Group of states in each energy region.
‡ From $\sigma(\theta)$ distribution and comparison with DWIA calculations.