^{60}Ni(α,^{3}He) 2013Sc06,2013ScZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	20-Jan-2020

No changes made since the 2015 update.

2013Sc06, 2013ScZZ: E(α)=38 MeV from WNSL-Yale tandem accelerator facility. Measured ^{3}He spectra, $\sigma(\theta)$, spectroscopic factors C^2S using a split-pole Enge spectrograph. FWHM ≈50 keV. Target=204 $\mu g/cm^2$ thick 99.7% enriched. Deduced levels, J, π. DWBA analysis. Comparison with shell-model calculations.

The main purpose of the neutron adding and neutron removal reaction studies by 2013Sc06 was to obtain occupancies of neutron orbitals, proton vacancies, and energy centroids of neutron, neutron-holes, proton-single particle excitations in ^{60}Ni and ^{62}Ni, and thereby investigate closure of $0f_{7/2}$ shell. Some data details of this study are supplied in 2013ScZZ.

Other:

1961Sa09: E=43 MeV. Measured E(^{3}He), magnetic spectrometer, θ=22°. Three groups at 0, 1700 and 2700 are reported; the 1700- and and 2700-keV peaks cannot be easily assigned to those observed in spectral figure 2 in 2013Sc06. There are either calibration issues or contribution from impurities.

The uncertainties in $d\sigma/d\Omega$ are estimated to be ≈4% for σ>1 mb/sr, ≈7% for 0.1<σ< 1.0 mb/sr, and ≈18% for σ< 0.1 mb/sr at their respective maxima. The uncertainties arising from possible contaminants or previously unidentified states for very weak transitions could be ≈0.02 mb/sr.

^{61}Ni Levels

E(level)†	L	C^2S	Comments
0			$d\sigma/d\Omega(7°)$=0.22 mb/sr.
67	3	3.33	$d\sigma/d\Omega(7°)$=2.01 mb/sr.
283			$d\sigma/d\Omega(7°)$=0.044 mb/sr.
656			$d\sigma/d\Omega(7°)$=0.013 mb/sr.
909	3	0.44	C^2S: for J^π=5/2$^-$. $d\sigma/d\Omega(7°)$=0.18 mb/sr.
1132	3	0.40	C^2S: for J^π=5/2$^-$. $d\sigma/d\Omega(7°)$=0.14 mb/sr.
1185			$d\sigma/d\Omega(7°)$=0.038 mb/sr.
1455	3	0.16	C^2S: for J^π=7/2$^-$. $d\sigma/d\Omega(7°)$=0.049 mb/sr.
2122	4	3.57	E(level): 1.7-MeV peak in 1961Sa09 may correspond to the strongly populated 2122 level. C^2S: for J^π=9/2$^+$. $d\sigma/d\Omega(7°)$=3.53 mb/sr.
2801	3	0.09	C^2S: for J^π=5/2$^-$,7/2$^-$. $d\sigma/d\Omega(7°)$<0.018 mb/sr.
2905	3	0.08	C^2S: for J^π=7/2$^-$.
3487	4	0.32	E(level): 2.7-MeV peak in 1961Sa09 may correspond to the strongly populated 2122 level. $d\sigma/d\Omega(7°)$=0.32 mb/sr.
3506			$d\sigma/d\Omega(7°)$=0.32 mb/sr.

† 2013Sc06 quote values from 1999-Nuclear Data Sheets of A=61 (1999Bh04). Values are nearly the same in Adopted Levels here.