

$^9\text{Be}(^{56}\text{Ni},^{55}\text{Ni}\gamma)$ 2019Sp02

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	30-Apr-2022

This dataset adapted from compiled dataset from 2019Sp02 in the XUNDL database by J. Chen (NSCL, MSU), July 2, 2019.

One-neutron knockout reaction.

2019Sp02: 85.9 MeV/nucleon ^{56}Ni secondary beam produced in projectile fragmentation 160 MeV/nucleon ^{58}Ni primary beam on a 610 mg/cm² ^9Be target at the Coupled Cyclotron Facility of NSCL-MSU, and fragments selected in flight using the A1900 fragment separator. The reaction target was 188 mg/cm² ^9Be . γ rays were detected using the SeGA array consisting of 16, 32-fold segmented HPGe detectors in two rings (37° and 90° relative to the beam axis) surrounding the target. Reaction residues entering the focal plane of S800 spectrograph were analyzed and identified event by event from energy loss and time of flight. Measured E_γ , I_γ , $\gamma\gamma$ -coin, (residue) γ -coin, parallel momentum distributions. Deduced levels and partial cross-sections. Comparison with large-scale shell-model calculations in the full pf space with the GXPF1A-cd-pn Hamiltonian using NUSHELLX code, and with experimental level structure of the mirror nucleus ^{55}Co .

 ^{55}Ni Levels

Measured inclusive cross section=38.0 mb 2(stat) 30(syst) for one-neutron knockout to all the bound states in ^{55}Ni .

Partial σ for each level is given under comments, either from 2019Sp02 when given explicitly, or read by the XUNDL compiler from plot in Fig. 3 of 2019Sp02. Uncertainties are statistical only. Authors mentioned that these values are upper limits only due to the possibility of missed, weak feeding transitions.

E(level) [†]	J^π [‡]	L	Comments
0	7/2 ⁻		Measured partial σ =29.1 mb 7 (77% 2) (2019Sp02).
2086 4	3/2 ⁻		Measured partial σ =1.81 mb 10 (read from Fig. 3 in 2019Sp02).
2466 4	3/2 ⁻		Measured partial σ =0.11 mb 10 (read from Fig. 3 in 2019Sp02).
2587 4	(5/2 ⁻)		Measured partial σ =0.71 mb 9 (read from Fig. 3 in 2019Sp02).
2842 8	(7/2 ⁻)		Measured partial σ =0.63 mb 10 (read from Fig. 3 in 2019Sp02).
2882 8	(9/2 ⁻ & 11/2 ⁻)		Measured parallel momentum distribution is displayed in Fig. 4 of 2019Sp02, but no L-transfer or J^π is deduced.
			Possible doublet of multiplet with configuration of $1f_{7/2}^{-1} \otimes$ (first 2 ⁺ state in ^{56}Ni).
3186 4	1/2 ⁺		Measured partial σ =1.42 mb 10 (3.7% 3) (2019Sp02).
3218 4	(1/2 ⁻)		Measured partial σ =2.32 mb 12 (6.1% 3) (2019Sp02).
3759 4	3/2 ⁺	2	Measured partial σ =0.38 mb 9 (read from Fig. 3 in 2019Sp02). L: from comparison of experimental momentum distribution with predictions of the eikonal theory. J^π : proposed by 2019Sp02 based on measured momentum distribution.

[†] From 2019Sp02.

[‡] Taken from literature (ENSDF database, 2014Sa46 and 2013Tr09). Exception is for 3759 level, where 2019Sp02 assign J^π from measured parallel momentum distribution.

 $\gamma(^{55}\text{Ni})$

E_γ [†]	E_i (level)	J_i^π	E_f	J_f^π
720	3186	1/2 ⁺	2466	3/2 ⁻
751	3218	(1/2 ⁻)	2466	3/2 ⁻
1099	3186	1/2 ⁺	2086	3/2 ⁻
1132	3218	(1/2 ⁻)	2086	3/2 ⁻
1293	3759	3/2 ⁺	2466	3/2 ⁻
2086	2086	3/2 ⁻	0	7/2 ⁻
2466	2466	3/2 ⁻	0	7/2 ⁻

Continued on next page (footnotes at end of table)

$^9\text{Be}(^{56}\text{Ni},^{55}\text{Ni}\gamma)$ 2019Sp02 (continued) $\gamma(^{55}\text{Ni})$ (continued)

E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π
2587	2587	(5/2 ⁻)	0	7/2 ⁻
2842	2842	(7/2 ⁻)	0	7/2 ⁻
2882	2882	(9/2 ⁻ & 11/2 ⁻)	0	7/2 ⁻

† From 2019Sp02.

 $^9\text{Be}(^{56}\text{Ni},^{55}\text{Ni}\gamma)$ 2019Sp02

Level Scheme

