

FAST-NEUTRON TOTAL AND SCATTERING CROSS SECTIONS OF ^{58}Ni
AND NUCLEAR MODELS

by

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ABSTRACT

The neutron total cross sections of ^{58}Ni were measured from ≈ 1 to > 10 MeV using white-source techniques. Differential neutron elastic-scattering cross sections were measured from ≈ 4.5 to 10 MeV at ≈ 0.5 MeV intervals with ≥ 75 differential values per distribution. Differential neutron inelastic-scattering cross sections were measured, corresponding to fourteen levels with excitations up to 4.8 MeV. The measured results, combined with relevant values available in the literature, were interpreted in terms of optical-statistical and coupled-channels models using both vibrational and rotational coupling schemes. The physical implications of the experimental results and their interpretation are discussed in the contexts of optical-statistical, dispersive-optical, and coupled-channels models.

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