ELASTIC AND INELASTIC SCATTERING OF 270 MeV HELIONS FROM ^{58}Ni, ^{90}Zr, ^{116}Sn AND ^{208}Pb

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The differential cross section angular distribution data for the elastic scattering of 270 MeV helions from ^{58}Ni, ^{90}Zr, ^{116}Sn and ^{208}Pb measured earlier[1] have been analysed using the optical model code Snoopy.[2] The optical model parameters determined by fitting the data are listed in Table I. The inelastic scattering data for the excitation of the low-lying levels of the above nuclei have been analysed in the framework of the macroscopic collective model

TABLE I

^{3}He optical model potential parameters at 270 MeV

Target	Vo MeV	r_o fm	a_o fm	W MeV	r_w fm	a_w fm
^{58}Ni	59.83	1.202	0.915	38.0	1.20	0.890
^{90}Zr	64.00	1.202	0.915	40.0	1.20	0.940
^{116}Sn	69.00	1.202	0.915	42.0	1.20	0.975
^{208}Pb	76.63	1.202	0.915	45.0	1.20	1.050

using the distorted wave Born approximation (DWBA). The DWBA calculations for inelastic excitations were performed using the code DWUCK4,[3] using the optical model parameters obtained from the analysis of the elastic scattering cross-sections. The inelastic scattering data are explained well by this procedure. As an example, we have shown in Fig. 1 the inelastic scattering data for the low-lying states of ^{58}Ni and the corresponding DWBA predictions. The (βR) [deformation length] values obtained in this work are in good agreement with the ones quoted in the literature. A detailed account of this work has been prepared for publication.

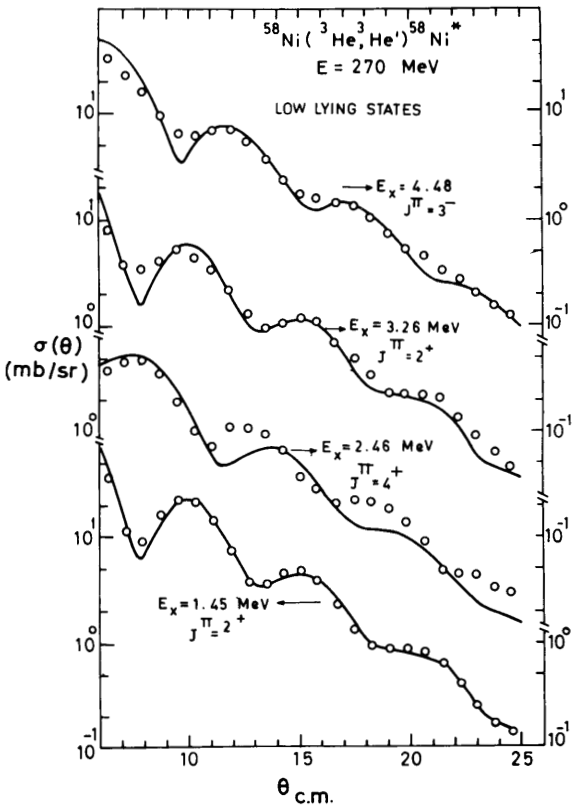

Figure 1. Angular distributions measured for inelastic scattering of ^{3}He ions to low-lying states in ^{58}Ni. The solid curves are DWBA calculations.

1) P.P. Singh et al., 1982 IUCF Scientific and Technical Report 1982, p. 109.

2) P. Schwandt, code SNOOPY, IUCF Computer Library.

3) P.D. Kunz, code DWUCK4, University of Colorado.