ANALYSIS OF NEUTRON SCATTERING ON 28-SI IN THE ENERGY RANGE FROM 6.8 TO 14.8 MEV

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At bombarding energies 6.8, 7, 8, 9, 10, 11 and 12 MeV angular distributions of partial cross sections were measured corresponding the 0_1^+(g.s.), 2_1^+(1.79MeV), 4_1^+(4.61MeV), 0_2^+(4.98MeV), 3^+(6.27MeV) and unresolved $3^- + 4_2^+$(6.88, 6.89MeV), $2_2^+ + 2_3^\mp$(7.38, 7.42MeV), respectively. The data of SEELIGER [1] are included into the interpretation.

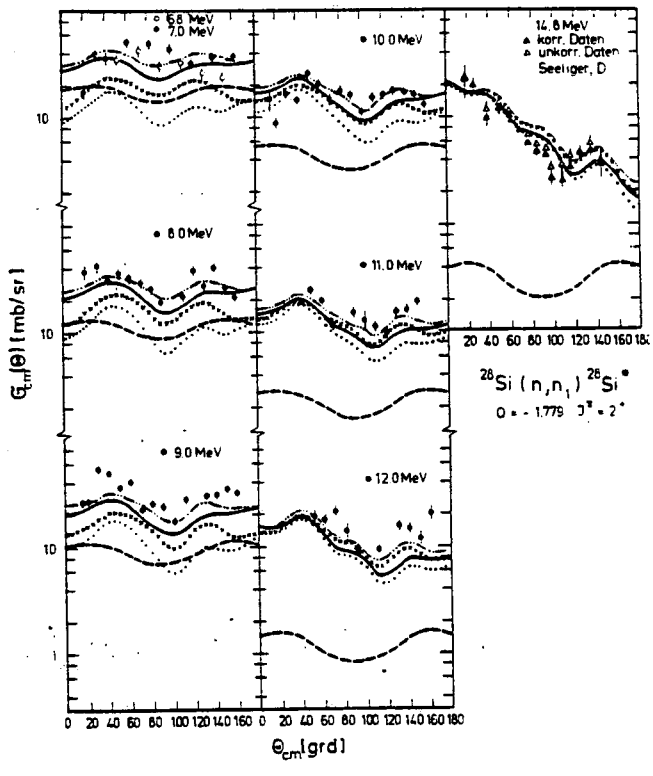
The elastic scattering can be described well in the full energy range in the frame of the optical model using parameters from OBST et al. [2] as well as in the coupled channels representation. In this case, the coupling within the ground state rotational band is realized with deformation parameters $\beta_2 = 0.48 \pm 0.07$ and $\beta_4 = -0.3 \pm 0.1$.

The inelastic scattering is described by superposition of direct and compound contributions. The calculations in the frame of the collective model are based on the following structure:

0_1^+, 2_1^+, 4_1^+	:	K=0 ground state rotational band, $\beta_2 = 0.48$, $\beta_4 = -0.3$
3^+	:	quadrupole vibrational state coupled to the g.s. with spin-flip, $\beta_2 = 0.2$
0_2^+	:	monopole vibrational state, $\beta_0 = 0.25$
3^-	:	octupole vibrational state, $\beta_3 = 0.3$
4_2^+	:	hexadecapole vibrational state, $\beta_4 = 0.25$
0_3^+, 2_3^+	:	K=0 rotational band with deformation in opposite to the g.s., $\beta_2 = -0.48$
$2_2^\mp$	:	quadrupole vibrational state coupled to the second band, $\beta_2 = 0.30$

The imaginary part of the optical potential must be chosen energy - dependent $W_D = 0.6E$ for the coupled channels calculation as well as

the Hauser-Feshbach part [4]. In this way, a consistent and good description of all data in the full energy range is obtained. Figure 1 gives the (n,n_1) angular distributions as an example



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