ANALYSIS OF NEUTRON SCATTERING ON 24-MG IN THE ENERGY RANGE FROM 7 TO 14 MEV

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At bombarding energies 7, 8, 9, 10, 11 and 12 MeV angular distributions of partial cross sections were measured corresponding the 0^+(g.s.), 2_1^+(1.37MeV), 3^+(5.24MeV), 4_2^+(6.01MeV) and unresolved $4_1^+ + 2_2^+$(4.12, 4.24MeV) states, respectively. The data of STELSON et al. [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 FERRER et al. [2] as well as in the coupled channels representation. Than the coupling within the ground state rotational band is realized with deformation parameters $\beta_2 = {}^+0.55$ and $\beta_4 = {}^-0.05$, whereby β_2 can be fixed between 0.50 and 0.60.

The inelastic scattering data can be described in the frame of a super-position of collective and compound contributions. In the collective model the 0^+, 2_1^+ and 4_1^+ states can be understood as a K=0 rotational band. The 2_2^+, 3^+, 4_2^+ states are described as members of a K=2 rotational band based on a quadrupole vibration with $\beta_2' = 0.7$.

The imaginary part of the optical potential must be chosen energy - dependent for the coupled channels calculation as well as the Hauser-Feshbach part [3] . 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.

^{24}Mg (n,n_1)

Q = -1.3686 MeV $I^{\pi} = 2^+$

—— CC + HF

········· CC

━━ HF
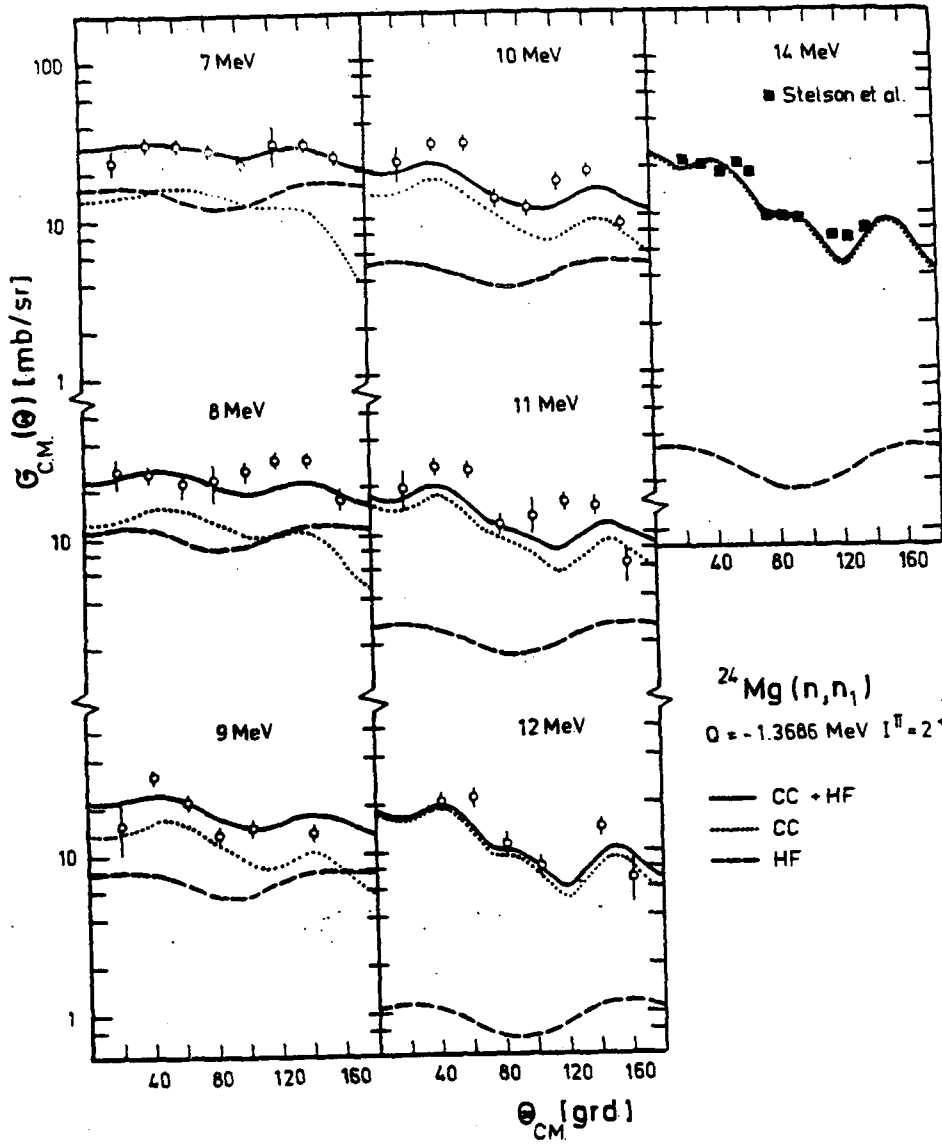
[1] P.H. STELSON et al., Nucl.Phys. 68(1965) 97

[2] J.C. FERPER et al., Nucl. Phys. A275(1977) 325

[3] H. FÖRTSCH, thesis, Techn. University of Dresden (1981)