Contribution ID: **8** Type: **Poster**

Probing the 17F+p optical potential at near barrier energies in a microscopic approach

Tuesday, 27 March 2012 13:00 (5 minutes)

Data of a recently measured proton elastic scattering angular distribution of 17F+p, at 4.3 MeV/u, were analyzed in a double folding microscopic approach and the optical potential as well as the structure of this proton rich nucleus was probed. The data were collected over a wide angular range by means of the DINEX Si-detector array with an overall solid angle of ~0.8 sr. The 17F radioactive beam was produced at the EXOTIC facility of LNL Italy by means of the in-flight technique and the reaction 1H(17O,17F)n. The solid angle and angular calibration of the DINEX-array was obtained via an additional run of 17F+198Au at a sub-coulomb energy.
For our theoretical analysis we adopted the JLM model, successful in describing elastic proton and neutron scattering from medium and heavy mass stable nuclei. This work will provide the plain ground to test the applicability of the model for drip line nuclei and energies well below E=10 A MeV while it will put in severe test the local density approximation, complementing existing work on stable projectiles. It should be noted that the microscopic approach involves folding procedures, where density distributions are considered explicitly. In this respect, we have been using densities of three different models to be confronted with our present data. Densities of 17O are also used by interchanging proton and neutron distributions for probing mirror symmetry. Total reaction cross sections are also deduced. The results will be discussed.

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Session Classification: Poster Session and Sandwich Lunch