Elastic scattering and fusion of ^{6}Li on ^{64}Zn at near-barrier

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In the last years a lot of work has been performed, both experimentally and theoretically (see ref. [1] and references therein), to study the effects of the breakup channel on the fusion and elastic scattering in collisions induced by light, unstable and stable, weakly bound nuclei at energies around the Coulomb barrier. Recently, much work has been devoted particularly to the study of the threshold anomaly (TA) in elastic scattering of weakly bound nuclei, such as ^{6}Li and ^{7}Li. For these projectiles the breakup channel is expected to be important even at energies below the Coulomb barrier and the usual TA may disappear.

In this contribution results concerning different reaction channels for the collision ^{6}Li+^{64}Zn at energies around the Coulomb barrier will be presented. Elastic scattering angular distributions were measured at eight beam energies from below to above the Coulomb barrier, $12.0 \leq E_{lab} \leq 22.0$ MeV. The experimental data were analyzed within the optical model in order to study the energy dependence of the interaction potential and to obtain total reaction cross-sections. The energy dependence of the real and imaginary parts of the potential shows that no usual TA is present for the ^{6}Li+^{64}Zn system.

Moreover, in order to further investigate on the influence of the breakup on the fusion channel, we have also extended to sub-barrier energies the fusion excitation function for the ^{6}Li on ^{64}Zn, previously measured by Gomes *et al.* [2] at energies close and above the barrier. The fusion cross-section was measured using an activation technique detecting off-line the delayed X-rays activity emitted by the evaporation residues and the energy range explored is $E_{c.m} = 9-37$ MeV.

Comparison of the deduced reaction cross-section and total fusion cross-section in [2,3] showed a reaction cross-section larger than the total fusion one at energies around the barrier and the authors concluded that the elastic break-up has significant cross-section at these energies. However, there are indications [4] that there may have been problems with the ^{6}Li+^{64}Zn fusion data in [2] and this could change this conclusion. Actually, from our new preliminary results the large difference between the reaction and the total fusion cross-sections, observed by Gomes *et al.* [2,3], is reduced.

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