

SEARCH FOR ^4He GLOBAL OPTICAL POTENTIAL AT LOW COLLISION ENERGIES

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Modelling the reactions with participation of the light exotic nuclei within modern theoretical approaches involves usually the cluster concept treating weakly bound projectiles as a few-body nuclear systems, for instance, $^6\text{He} = \alpha + n + n$, $^9\text{Be} = \alpha + \alpha + n$ and others. The α -clusters are usual constituents of such models.

Application of the theoretical models requires determination of cluster-target interactions, which is generally chosen in the form of corresponding optical potential. However, in the case of the α particle scattering the optical model does not provide appropriate description of the experimental data at low energies where anomalous large angle scattering (ALAS) takes place [1]. Within this work, we propose to construct the ^4He global optical potential taking the ALAS effects into account semiclassically. In this case, the corresponding contribution to the α particle elastic scattering cross section can be described introducing an additional l -dependent imaginary term into the optical potential in order to simulate the high-spin quasimolecular α particle states in compound nuclear system. We perform the systematical analysis of the large amount of available experimental data on the α particle elastic scattering in order to provide explicit form of the corresponding global optical potential.

1. M.Brenner. Clustering Phenomena in Atoms and Nuclei, edited by M.Brenner, T.Lonnroth, and F.B.Malik // Springer-Verlag, Berlin, Heidelberg. 1992. P.327.