

Study of repulsive nature of optical potential for high energy $^{12}\text{C}+^{12}\text{C}$ elastic scattering

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The elastic scattering can provide the important information for the property of nucleon-nucleon (NN) interaction. At recently high energy $^{12}\text{C}+^{12}\text{C}$ elastic scattering has been theoretically studied [1][2]. It is found that the nuclear potential is changed from attraction to repulsion with increasing the projectile's energy, and then the shape of the angular distribution of elastic scattering is also changed. It includes three-body effect and contribution of tensor force. We will perform the experiment of 200-400MeV/A $^{12}\text{C}+^{12}\text{C}$ elastic scattering to measure the angular distribution of elastic scattering at Institute of Modern Physics (IMP) in Lanzhou. Through the comparison between the experimental data and the theoretical calculation, it clearly explains the repulsive nature of optical potential. The experimental determination of the transition energy through the precise measurement of elastic scattering provides quite important information about the TBF effect, which is one of the most important medium effects in high-density nuclear matter, and its energy dependence, in addition to the role of the tensor force which is one of the main origins of energy dependence of heavy-ion optical potential in this energy region.

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