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Elastic scattering measurement for the 10Be+natPb reaction at above the Coulomb barrier energy

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Recently, elastic scattering has been of great interest to study the information on the exotic structure and reaction mechanism of the weakly bound nuclei. In the last few years, some of the experimental and theoretical works have appeared for proton as well as neutron-rich nuclei at above and near barrier energies [1-3]. Interesting features have been discovered in the study of the elastic scattering induced by light radioactive ion beams. Strong Coulomb rainbow (Coulomb-nuclear interference peak) suppressions are found for neutron halo nuclei such as 11Be,11Li and 6He elastic scattering from heavy targets at energy near the Coulomb barrier. However, elastic scattering with proton halo nuclei does not reveal Coulomb rainbow suppressions showing small break-up coupling effects on elastic scattering at an energy about three times the Coulomb barrier. Under this scenario, a systematic study on elastic scattering at well above the Coulomb barrier energy is required to unfold the new observations in the reactions with near drip-line nuclei [4, 5]. In this context, we have measured elastic scattering at three times of the Coulomb barrier energy using 10Be projectile beam at Institute of Modern Physics, Lanzhou. The secondary beams of radioactive isotopes were produced by the fragmentation of (60 MeV/nucleon) 16O primary beam on a 3000 μm Be target and separated by Radioactive Ion Beam Line in Lanzhou (RIBLL). The scattered particles were detected by four sets of ΔE-E detector telescopes. A Monte Carlo simulation is performed to evaluate the absolute differential cross sections. Continuum Discretized Coupled Channels method will be followed to disentangle the Coulomb and Nuclear breakup coupling effects on the suppression of Coulomb Rainbow. The detailed observations made from the measured elastic scattering data along with the theoretical calculations using FRESCO will be presented in the conference.

Keywords: Elastic scattering, halo nuclei, Coulomb and Nuclear breakup coupling

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