Elastic Scattering Of Proton-rich Nuclei 9c And 8b On A Pb Target

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Elastic scattering is one of the important tools to study the size and shape of exotic nuclei. Many interesting phenomena have been discovered by studying the elastic scattering angular distributions for neutron-rich nuclei, such as ^{6}He, ^{11}Be and ^{11}Li. However, the experimental data for the proton-rich beams, such as ^{9}C and ^{8}B, is still scarce. One of the reasons is that the radioactive beams of ^{9}C and ^{8}B are difficult to produce, particularly at lower energies. The elastic scattering angular distributions of ^{9}C and ^{8}B on a Pb target were measured at the energies around 3 times of Coulomb Barriers at the Heavy Ion Research Facility in Lanzhou, Radioactive Ion Beam Line in Lanzhou, China (HIRFL-RIBLL). The measured differential cross sections show that Coulomb-nuclear interference peaks (CNIP) are not suppressed in these systems, in contrast to the experimental phenomena of the neutron-rich nuclei on heavy targets at the energies around Coulomb barriers. The experimental data was analysed using in optical model and continuum discretized coupled-channels (CDCC) method. The results show that the breakup has a small influence on the elastic scattering, in spite of the very low bounding energies (0.137 MeV for $^{8}\mathrm{B}\rightarrow{}^{7}\mathrm{Be}+p$; 1.43 MeV for $^{9}\mathrm{C}\rightarrow{}^{7}\mathrm{Be}+2p$). One of the explanations for this behaviour may originate from the fact that the valence particles in ^{9}C and ^{8}B are proton.