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Measurements of multinucleon transfer reactions of 136Xe + 198Pt for production of exotic nuclei

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Multinucleon transfer (MNT) reaction between two heavy ions at energies around the Coulomb barrier is considered as a promising candidate to produce and investigate exotic nuclei. Especially in the region of neutron-rich nuclei around the neutron magic number of 126, which is difficult to access by other production methods, the MNT reaction is expected to provide a means to efficiently produce them.
The nuclear region of the neutron magic number of 126 has been attracting an astrophysical interest because the waiting point nuclei on the r-process path, which are considered as progenitors of the peak at the mass number of 195 in the solar r-abundance distribution, are located there. We have been developing a gas-catcher type laser ion source named KEK Isotope Separation System, which is now on commissioning, to produce, separate and measure the nuclear properties of the neutron-rich nuclei around the neutron magic number of 126, which will be produced by the MNT reaction. We adopted the reaction system of 136Xe + 198Pt, which is considered to be one of the best candidates to efficiently produce the nuclei of interest. In order to investigate the feasibility of the nuclear production of the system, we have studied the collisions between 136Xe and 198Pt at the laboratory energy of 8 MeV/A by using the large acceptance magnetic spectrometer VAMOS++ at GANIL.

After the presentation at the last EMIS conference, where we reported on the experiments and the progress status of the analysis, we have finally fixed the cross sections for the projectile-like fragments produced by transfer reactions from -4 to +4 protons. In this presentation, we will report on the final cross sections of them, which indicate that the large contribution of the deep-inelastic transfer with large charge and mass diffusion to the large cross sections for the transfer of more than one proton.

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