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Systematic measurement of charged pion production in HIC with RI beams at RIKEN-RIBF

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Charged pion production in HIC is one of the possible probes to study the density dependent symmetry energy. In 2016, the experiments for the measurement of charged pion ratio in neutron-rich and in neutron-deficient Sn+Sn system at the beam energy of $E/A=270$ MeV were conducted at RIKEN-RIBF.

A constraint on the symmetry energy around the nuclear density of $\rho \sim 1.5\rho_0$ was given based on this charged pion measurement.

In addition to Sn RI beam, there are several RI beams were produced and HIC data with those beams were taken at the same time.

In this talk, we will present the analysis status of systematic pion measurement in such reactions, where the charged pion ratio data of the asymmetry delta range of $= \text{abs}(N-Z)/A : 0.086 - 0.226$, and the energy range of $E/A : 249 - 285$ MeV can be expected.

Status of the new $^{124,136}\text{Xe}+^{112,124}\text{Sn}$ Spirit experiments will also be discussed.

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