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The measurement and analysis of neutron-neutron correlation function in the heavy ion experiment.

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The isospin-dependent equation of state of nuclear matter, i.e. symmetry energy $E_{sym}(\rho)$ plays an important role in the study of nuclear physics and astrophysics. The calculation of transport model has shown the $E_{sym}(\rho)$ affects significantly the nucleon emission times in HIC, leading to significant variation of two-nucleon correlation functions.

Recent years, a compact spectrometer for heavy ion experiment (CSHINE) has been built, which has the ability to measure light charged particles, and the two charged particle correlation functions have been obtained. In this year, a neutron array with 212ps time resolution has been mounted on CSHINE[arXiv:2406.18605], and the neutron-neutron correlation function is measured in $25MeV/u^{124}Sn + ^{124}Sn$. The effect of cross talk event on n-n correlation function has been analyzed. Finally, the scattering length, effective range, source size and timescale are obtained by Lednicky-Lyuboshitz model.

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