

WPCF 2023 - XVI Workshop on Particle Correlations and Femtoscopy & IV Resonance Workshop 2023



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Correlation Function studies at intermediate energies at CSHINE

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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. In terrestrial lab, heavy ion collision provides a unique way to constrain $E_{sym}(\rho)$. So a compact spectrometer for heavy ion experiment (CSHINE) is built and particle correlation functions are measured.

The HBT correlation function method is applied as an chronometer to extract the emission timescale and emission order of hydrogen isotopes from the intermediate velocity source formed in $30MeV/u^{40}Ar+^{197}Au$. The proton emission timescale $\tau_p \approx 100$ fm/c is extracted by the fit of Koonin-Pratt equation with CRAB code. And the dynamic emission order of τ_p τ_d τ_t is evidenced via the correlation functions of nonidentical particle pairs, indicating that the neutron rich particles are emitted earlier. Meanwhile, transport model simulations demonstrate that the emission order of isospin dependent particles depends sensitively on the stiffness of the nuclear symmetry energy [PLB, 825, 136856 (2022)].

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