ID de Contribution: **21** Type: **Oral Presentation**

Symmetry energy constraints from isospin transport: Recent results from the INDRA-FAZIA apparatus

mardi 10 septembre 2024 11:50 (20 minutes)

Heavy-ion collisions at intermediate energies (20-100 MeV/nucleon) are an essential tool for probing the properties of nuclear matter in far-from-equilibrium conditions. Among other topics, they allow the investigation of isospin transport phenomena, which can be interpreted within the framework of the Nuclear Equation of State (NEoS). This area of research holds significant interest due to its implications in both nuclear physics and astrophysics [1].
The INDRA-FAZIA apparatus [2] is particularly well suited to study such phenomena. The coupled apparatus, operating at GANIL since 2019, combines the excellent identification capability of FAZIA, positioned at forward polar angles to detect ejectiles in the quasiprojectile (QP) phase space, with the large angular coverage of INDRA, which is useful to construct global variables for reaction centrality estimation.

Here, we report on the most recent results from the INDRA-FAZIA apparatus. The main focus will be on its first experiment [3,4], which was aimed at studying isospin diffusion by comparing the results of the two asymmetric reactions ^{64,58}Ni+^{58,64}Ni with both the corresponding neutron rich and neutron deficient symmetric systems at Fermi energies, employing the isospin transport ratio technique [5].
The neutron-to-proton content of the heavy QP remnant, directly accessible thanks to the identification performance of FAZIA, is exploited as an isospin observable to highlight the isospin equilibration between asymmetric projectile and target. By applying the impact parameter reconstruction method proposed in [6], we hereby provide a model-independent experimental evaluation of the degree of isospin equilibration taking place in Ni-Ni collisions at 32~MeV/nucleon across varying reaction centralities.
This experimental result can be easily compared with the predictions of any transport model: in this presentation, we also show a first comparison with BUU@VECC-McGill model predictions [7] assuming different NEoS parametrizations, which represents a promising result in view of constraining the symmetry energy behavior at sub- to saturation densities.

[1] A. Sorensen et al., Progr. Part. Nucl. Phys. 134, 104080 (2024).
[2] G. Casini and N. Le Neindre, Nucl. Phys. News 32, 24 (2022).
[3] C. Ciampi et al., Phys. Rev. C 106, 024603 (2022).
[4] C. Ciampi et al., Phys. Rev. C 108, 054611 (2023).
[5] F. Rami et al., Phys. Rev. Lett. 84, 1120 (2000).
[6] J. D. Frankland et al., Phys. Rev. C 104, 034609 (2021).
[7] S. Mallik et al., J. Phys. G: Nucl. Part. Phys. 49, 015102 (2022)

Auteur principal: CIAMPI, Caterina (GANIL)

Co-auteurs: CHBIHI, Abdou (GANIL); Dr GRUYER, Diego (LPC Caen); GULMINELLI, Francesca (Laboratoire de Physique Corpusculaire, CNRS, ENSICAEN, UMR6534, Université de Caen Normandie, CEDEX, 14050 Caen, France); FRANKLAND, John (IN2P3); LENEINDRE, Nicolas (Normandie Univ, ENSICAEN, UNICAEN, CNRS/IN2P3, LPC Caen, 14000 Caen, France); BOUGAULT, Rémi (LPC Caen); MALLIK, Swagata Mallik (LPC Caen)

Orateur: CIAMPI, Caterina (GANIL)

Classification de Session: Constraints from heavy-ion collisions at intermediate energies

Classification de thématique: Constraints from heavy-ion collisions at intermediate energies