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Short-range correlations in stable and asymmetric nuclei investigated at R³B

The formation of short-range correlated nucleon-nucleon pairs (SRCs), primarily composed of neutron-proton pairs [1], appears to be a universal feature in atomic nuclei [2]. Interestingly, measurements in electron scattering indicate that protons become significantly more correlated in asymmetric nuclei as a function of neutron excess. This has potential implications for the description of cold dense nuclear matter as for neutron stars. However, data have been so far restricted to stable nuclei for which the N/Z asymmetry, at maximum ~1.6, is strongly correlated to the mass number, leaving open the question of the origin of the evolution of proton-neutron short range correlations with N/Z. To overcome this ambiguity, we performed an experiment at the R³B setup at GSI-FAIR [3] as part of the FAIR Phase-0 experimental program to measure SRC in the most neutron-rich nucleus yet, 16C, with N/Z=1.67, that is slightly larger than the one of 208Pb (1.53). We employ hard proton knockout reactions in inverse kinematics of 16C beam at 1.25 GeV/nucleon, as well as 12C beam as reference, to study SRC behavior. In this talk, I will discuss the final results of the SRC behavior investigation in stable and neutron-rich nuclei (12C and 16C) based on the study of kinematical variables and comparison with QFS and GCF based calculations [4;5]. In conclusion, I will present prospects for the follow-up research program at FAIR.

[1] R. Subedi, R. Shneor, Science, 1156675, 2008. [2] M. Duer et al. (CLAS Collaboration), Nature, 560:617, 2018.
[3]https://www.gsi.de/work/forschung/nustarenna/nustarenna_divisions/kernreaktionen/activities/r3b.
[4] T. Berggren and H. Tyren. Quasi-free scattering. Annual Review of Nuclear Science, 16:153–182, 1966.
[5] Ronen Weiss and Nir Barnea. Contact formalism for coupled channels. Phys. Rev. C, 96:041303, Oct 2017.

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