Contribution ID: **23** Type: **not specified**

Experimental study of cold dense nuclear matter

Friday, 3 March 2023 10:30 (40 minutes)

The fundamental theory of nuclear interactions, Quantum Chromodynamics (QCD), operates in terms of quarks and gluons at higher resolution, and at lower resolution the relevant degrees of freedom are nucleons. Two-nucleon Short-Range Correlations (SRC) help to interconnect these two descriptions. SRCs are temporary fluctuations of strongly-interacting compact pairs of nucleons. The distance between the two SRC nucleons is comparable to their radii and individual momenta are larger than the fermi sea level. According the electron scattering experiments held in the last decade, SRCs have far-reaching impacts on many-body systems, the nucleon-nucleon interactions, and nucleon substructure. The modern experiments with ion beams open new pathways in SRC research. Inverse kinematics with ion beams and cryogenic liquid hydrogen target makes possible to study properties of the nuclear fragments after quasi-elastic knockout of a single nucleon or SRC pair. The first SRC experiment at BM@N (2018) with a carbon beam has shown that detection of an intact 11B nucleus after the interaction selects out the quasi-elastic knockout reaction with minimal contribution of initial- and final-state interactions. Also, 23 events of SRC-breakups showed agreement in SRC properties as known from electron beam experiments. The analysis of the second measurement of SRC at BM@N in 2022 with an improved setup is currently ongoing.

Primary author: PATSYUK, Maria (MIT)

Presenter: PATSYUK, Maria (MIT)