クラスター階層セミナー
Cluster-Hierarchy Seminar

Clusters & Hierarchies

Short-Range Correlation And The Quarks Within

Prof. Or Hen (MIT)

日時： 1月20日（月） 16:30—18:00

場所： 南5号館503CD会議室

Abstract: Since the discovery of quarks, nuclear physicists have been trying to understand the relation between the lower-resolution description of nuclei using protons and neutrons, and the underlying higher-resolution description in terms of quarks and gluons. At the intersection of these two paradigms are Short-Range Correlations (SRC): pairs of strongly interacting nucleons whose distance is comparable to their radii. Due to their overlapping quark distributions and strong interaction, SRC pairs serve as a bridge between low-energy nuclear structure, high- density nuclear matter, and high-energy quark distributions, with important consequences for strong-interaction physics, hadronic structure and astrophysics.
In this talk I will present new results from high-energy electron scattering experiments that probe SRC pairs via measurements of exclusive hard breakup reactions. Special emphasis will be given to the use of SRCs in probing the strong nuclear interactions at sub fermi distances and effect of SRCs on the behavior of protons in neutron-rich nuclear systems and its implications to dense nuclear systems such as neutron stars. Pursuing a more fundamental understanding of short-distance interactions, I will present new measurements of the internal quark-gluon sub-structure of nucleons and show how its modification in the nuclear medium relates to SRC pairs and short-ranged nuclear interactions. Last, I will discuss the development of new effective theories for describing short-ranged correlations, the way in which they relate to experimental observables, and the emerging universality of short-distance and high-momentum physics in nuclear systems.

連絡先：物理学系　中村隆司 Contact: Prof. Takashi Nakamura (ext:2652)

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