

The 121st HENPIC seminar by Prof. Toru Kojo (CCNU), Sep. 10, 2020, Thursday, 10:30 am (UTC+8)

Talk title: Hard-core deconfinement and soft-surface delocalization from nuclear to quark matter

Speaker : Prof. Toru Kojo (CCNU)

Abstract:

We propose a novel concept of hard and soft realizations of deconfinement from nuclear to quark matter. Hard Deconfinement takes place when bulk thermodynamics is dominated by the core properties. The energy density and mechanical pressure in a nucleon, which are related to the gravitational form factor in scattering experiments, are found to be consistent with high density constraints known from neutron star phenomenology. Meanwhile Soft Deconfinement is driven by quark exchanges at intermediate distance and begins before Hard Deconfinement happens. To describe this phenomenon we use a model of quantum percolation, and discuss a quantum mechanical problem of quarks hopping among baryons. We describe delocalization of quark wavefunctions as well as the Anderson localization. Finally we discuss how the quark Fermi sea is developed as nuclear matter transforms into quark matter, and conjecture a scenario leading to a momentum shell model in Quarkyonic Matter.

Self-introduction:

Toru Kojo, Ph.D. from Kyoto University in 2008, a postdoc at RIKEN BNL for 2008-2011, a postdoc at Bielefeld university in 2011-2013, a research associate at University of Illinois at Urbana-Champaign in 2013-2015, currently an associate professor at Central China Normal University since 2015. He is working on QCD in extreme conditions and nuclear astrophysics.

Presenter: Prof. KOJO, Toru (CCNU)