IOA Colloquium

Stiffening of matter in quark-hadron continuity

Date 15:00 - 16:00, 2021/11/12 (Friday)

Place 1131, Building 9 (Zoom Meeting ID: 836 0432 8811)

Speaker

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Abstract

We discuss stiffening of matter in quark-hadron continuity. We introduce a model that relates quark wavefunctions in a baryon and the occupation probability of states for baryons and quarks in dense matter. In dilute regime, the confined quarks contribute to the energy density through the masses of baryons, but do not directly contribute to the pressure, hence the equations of state are very soft. This dilute regime continues until the low momentum states for quarks get saturated; this may happen even before baryons fully overlap, possibly at density slightly above the nuclear saturation density. After the quark saturation the pressure grows rapidly while changes in energy density are modest, producing a peak in the speed of sound. We conclude that an early onset of quark matter leads to stiffening of matter consistent with the neutron star observations.

Biography

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.