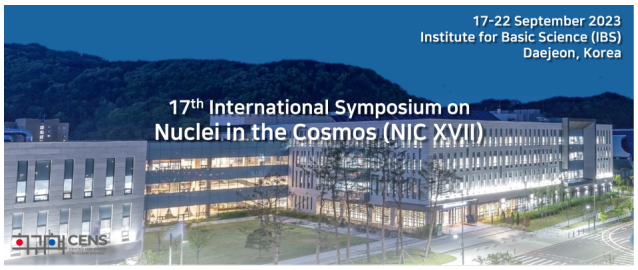

Contribution ID: **56** Type: **Poster**

Density dependence of the nuclear symmetry energy: dilute and dense matter

Tuesday, 19 September 2023 17:00 (5 minutes)

The properties of neutron-rich nuclear systems are largely determined by the density dependence of the nuclear symmetry energy. Experiments aiming to measure the neutron skin thickness [1,2] and astronomical observations of neutron stars and gravitational waves [3,4] offer valuable information on the symmetry energy at sub- and supra-saturation densities, respectively.
The Korea-IBS-Daegu-SKKU (KIDS) theoretical framework for the nuclear eqution of state (EoS) and energy density functional (EDF) [5-7] offers the possibility to explore the symmetry-energy parameters such as J (value at saturation density), L (slope at saturation), K_{sym} (curvature at saturation), and so on, independently of each other and independently of assumptions about the in-medium effective mass. Within this versatile and physically motivated framework, any set of EoS parameters can be transposed into a corresponding EDF and readily tested in microscopic calculations of nuclear properties [6-8]. Related studies within KIDS of symmetry-energy parameters based on both astronomical observations and bulk nuclear properties [8,9] and a comprehensive Bayesian analysis of both isoscalar and isovector nuclear observables including giant resonances [10] were published recently.
In this talk, I plan to discuss the importance of high-order parameters such as K_{sym}, indications for a model decoupling of the nucleonic fluid from dense and dilute regimes, implications for the PREX-CREX puzzle, and first attempts to extend the framework to quarkionic matter [11].
References
[1] T. Aumann et al., Phys. Rev. Lett. 119 (2017) 262501.
[2] D. Adhikari et al. (PREX Collaboration), Phys. Rev. Lett. 126 (2021) 172502;
D.Adhikari et al. (CREX Collaboration), Phys. Rev. Lett. 129 (2022) 042501.
[3] B. P. Abbott et al., Phys. Rev. X 9 (2019) 011001.
[4] M. C. Miller et al., Ap.J.L. 918 (2021) L28.
[5] P. Papakonstantinou et al., Phys. Rev. C 97 (2018) 014312.
[6] H. Gil, P. Papakonstantinou, C. H. Hyun, Y. Oh, Phys. Rev. C 99 (2019) 064319.
[7] H. Gil et al., Phys. Rev. C 100 (2019) 014312.
[8] H. Gil et al., Phys. Rev. C 103 (2021) 034330.
[9] H. Gil, P. Papakonstantinou, C. H. Hyun, Int. J. Mod. Phys. E 31 (2022) 2250013.
[10] Jun Xu, P. Papakonstantinou, Phys. Rev. C 105 (2022) 044305.
[11] P. Papakonstantinou, C. H. Hyun, Summetry 15 (2023) 683.

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Session Classification: Poster session (High-density matter)

Track Classification: High-density matter