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How perturbative QCD constrains the Equation of State at Neutron-Star densities

Sunday 6 February 2022 20:00 (20 minutes)

The rapid evolution of neutron-star astronomy in recent years is for the first time giving us empirical access to the physics of the cores of neutron-stars, the internal structure of which is determined by the equation of state (EoS) of strongly interacting matter. In this talk I demonstrate in a general and analytic way how high-density information about EoS of strongly interacting matter obtained using perturbative Quantum Chromodynamics constrains the same EoS at densities reachable in physical neutron stars. The results can be used to propagate the pQCD calculations reliable around 40ns to lower densities (starting from 2.2 ns) in the most conservative way possible. These purely theoretical results are independent of astrophysical neutron-star input and hence they can also be used to test theories of modified gravity and BSM physics in neutron stars.

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Track Classification: Student Talks