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Dense and Hot QCD at Strong Coupling and Neutron Star Phenomenology

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Solving Quantum Chromodynamics (QCD) at intermediate density and temperature is a long- standing open problem. Since the traditional methods don't work in this region, even the precise phase structure of QCD is currently not known. The hot and dense part of the QCD phase diagram is probed in binary neutron star mergers. It is also conjectured to include a critical end point of the nuclear to quark matter transition whose location in the phase diagram will be narrowed down by upcoming heavy-ion experiments.The subject of the talk is the recently developed novel framework for the equation of state (EoS) of dense and hot QCD. This framework bridges the gap in theoretical predictions at intermediate densities by using the gauge/gravity duality, which maps the strongly coupled QCD to classical higher dimensional gravity. The model combines predictions from the gauge/gravity duality with input from lattice field theory, QCD perturbation theory and traditional nuclear theory methods.I will focus the recent results of this approach (i.e. the state-of-art QCD-EoSs, predictions for QCD phase diagram, QCD critical end point, applications to static, spinning neutron stars and neutron star mergers)

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