

# Dark Matter and Stars: Multi-Messenger Probes of Dark Matter and Modified Gravity

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## QCD in the Cores of Neutron Stars

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Rapid advancement in neutron-star observations allows unprecedented empirical access to cold, ultra-dense QCD matter. The combination of these observations with theoretical calculations reveals previously inaccessible features of the equation of state and the phase diagram of QCD. In this talk, I will demonstrate how perturbative-QCD calculations at asymptotically high densities can provide robust constraints on the equation of state at neutron-star densities. This approach offers a way to test the fundamental assumptions that neutron stars are described by the Standard Model (SM) and general relativity, that could allow us to test various dark matter models and beyond GR scenarios.

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