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Neutron stars and the cosmological constant problem

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Phase transitions can play an important role in the cosmological constant problem, allowing the underlying vacuum energy, and therefore the value of the cosmological constant, to change. Deep within the core of neutron stars, the local pressure may be sufficiently high to trigger the QCD phase transition, thus generating a shift in the value of the cosmological constant. The gravitational effects of such a transition should then be imprinted on the properties of the star. In this talk, working in the framework of General Relativity, I provide a new model of the stellar interior, allowing for a QCD and a vacuum energy phase transition. I determine the impact of a vacuum energy jump on mass-radius relations, tidal deformability-radius relations, I-Love-Q relations and on the combined tidal deformability measured in neutron star binaries.

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