

XVth Quark Confinement and the Hadron Spectrum



Contribution ID: 316

Type: Oral

Pulsar Timing Constraints on New Mechanisms of Energy Loss in Neutron Stars

Monday 19 August 2024 17:30 (30 minutes)

The neutron lifetime anomaly speaks to the possibility of exotic decay channels of the neutron. The very existence of neutron stars constrains the strength of such effects, and in this talk I develop how precisely determined energy-loss constraints, particularly anomalous binary-pulsar period lengthening, limit not only the total baryon loss rate across the star but also the parameters of the particle physics models that can produce such loss. To do this, we compute the new processes in the dense nuclear medium found at the core of a neutron star, employing the techniques of relativistic mean-field theory. Focusing on scenarios in which the dark-sector particles do not accumulate in the star, we extract limits on in-vacuum exotic neutron decays, and we determine them for various equations of state, noting their implications.

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Session Classification: Nuclear and Astro-particle Physics

Track Classification: F: Nuclear and Astro-Particle Physics