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How neutron star properties disfavor a nuclear chiral density wave

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Anisotropic phases are hypothesised to play an important role in the QCD phase diagram for small temperatures and large densities. I will present a study of such a phase, the chiral density wave (CDW), within a nucleon-meson model, taking also into account the nucleonic vacuum fluctuations. In particular, the main goal is exploring the possible existence of the CDW in the interior of neutron stars. With that in mind, imposing beta equilibrium and electric charge neutrality, I will discuss whether, and for what parameter choices, this phase is energetically preferred. I will then demonstrate the construction of compact stars with an anisotropic interior and, comparing with observations, I will show that realistic stars do not have an anisotropic (CDW) core.

Autoren: Dr. SCHMITT, Andreas (University of Southampton); PAPADOPOULOS, Orestis (University of Southampton)

Vortragende(r): PAPADOPOULOS, Orestis (University of Southampton)

Sitzung Einordnung: Talks