

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

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Uniformly rotating compact stars with a dark matter halo

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In this contribution we consider the uniform rotation of compact stars admixed with dark matter, which forms an extended halo. We use as inputs state of the art equations of state like the hadronic the DD2, IST ones as well a hybrid quark-hadron equation of state based on a recently developed relativistic density functional for quark matter. The resulting configurations contain a typical dark matter to baryonic matter fractions of the order up to 3%.

We report a significant frame dragging effect caused rotation of the dark matter halo and confront this results with the same setup for static compact stars in order to draw conclusions. We discuss astrophysical scenarios like compact stars constrains from the fastest neutron stars observed, mergers of compact stars with halos, and cooling observation of compact stars.

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