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E. Giangrandi: Stability and gravitational collapse of dark matter admixed neutron stars

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We study the impact of accumulated asymmetric bosonic dark matter on neutron star properties, including tidal deformability, maximum masses, radii, etc. The conditions at which dark matter particles tend to condensate in the core of a star or create an extended halo are presented. We show that at some values of mass, interaction scale, and relative fraction, the dark matter core becomes gravitationally unstable leading to a collapse into a black hole. By analyzing observational data of old neutron stars, we constrain the range of model parameters and the amount of accumulated dark matter. Moreover, we discuss how the ongoing and future X-ray, radio, and GW observations could shed light on dark matter admixed compact stars and put multi-messenger constraints on its effect.

Session Classification: Session 5