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Neutron stars as dark matter probes

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We study an impact of asymmetric fermionic and bosonic dark matter on general properties and tidal deformabilities of neutron stars and their ability to reach the two solar masses limit. It allows us to present a new range of masses of dark matter particles and their fractions inside the star. Our analysis is based on the observational fact of the existence of two pulsars reaching this limit and on the theoretically predicted reduction of the neutron star maximal mass caused by the accumulation of dark matter in its interior. We also explore conditions of formation a dense dark matter core or an extended dark halo around a neutron star. By using recent results on the spatial distribution of dark matter in the Milky Way, we present an estimate of its fraction inside the neutron stars located in the Galaxy center.

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