

Boson Stars and Dark Matter

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The concept of boson stars (BSs) was first introduced by Kaup and Ruffini-Bonazzola in the 1960s. Following this, a lot of attention has been directed to the possible role of BSs in astrophysics whether as a dark matter (DM) candidate or as the less exotic alternative to different types of black holes.

Here, for the first time, we introduce a new class of compact objects as a mixture of self-interacting bosonic DM and normal baryonic matter named DM admixed neutron star (NS). It is shown that depending on the model parameters a dense DM core inside NS or an extended dark halo around it can be formed. Moreover, the observational consequences of DM admixed NSs is discussed in light of the current and future multi-messenger observations.

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