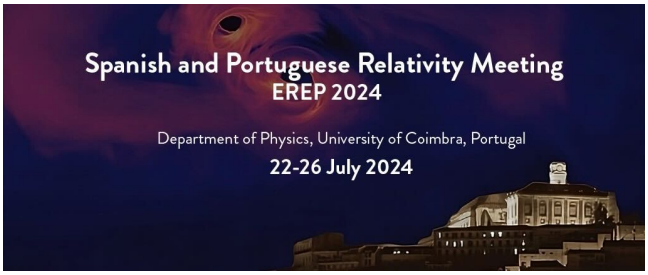


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# Two-fluid formalism and phenomenology of the dark matter admixed neutron stars

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A two-fluid formalism for curved space-time and phenomenology of the dark matter admixed neutron stars Accumulation of a sizable amount of dark matter in the interiors of neutron stars can significantly modify the observational properties and merger dynamics of these relativistic objects. We propose a two-fluid formalism for the description of a mixture of baryon matter and dark matter existing in curved space-time. The formalism is applied to solving the problem of relativistic hydrostatics and establishes a rigorous scaling between the microscopic parameters of the components, i.e. chemical potentials of baryon matter and dark matter. Furthermore, the formalism is extended to studying gravitational perturbations of the hydrostatic system in order to define the corresponding Love numbers giving direct access to tidal deformability of the dark matter admixed neutron stars. The scenarios of non-interacting fermionic and self-interacting bosonic dark matter are considered in order to constrain the parameters of the dark matter particles. Phenomenological consequences related to the observational mass-radius curves and thermal evolution on neutron stars are also discussed.

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