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Relativistic stars in scalar-tensor theories with disformal coupling

HECTOR O. SILVA, University of Mississippi, MASATO MINAMITSUJI, Instituto Superior Técnico — We discuss a general formulation to study the structure of slowly-rotating relativistic stars in a broad class of scalar-tensor theories including disformal coupling to matter. Our approach includes as particular cases theories with generalized kinetic terms and generic scalar field potentials, and contains theories with conformal coupling as particular limits. We propose a minimal model to investigate the role of the disformal coupling on the non-perturbative effect known as spontaneous scalarization, which causes relativistic star solutions in certain classes of scalar-tensor theories to differ dramatically from their general relativistic counterparts. Moreover, we show that the moment of inertia and compactness of stars are equation of state independent, which can potentially be used to constrain the model observationally.

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