

ABSTRACT ONLY

BREAKING OF QUADRUPOLEAR F -MODES
UNIVERSAL RELATIONSHIPS UNDER THE
SLOW HADRON-QUARK CONVERSION
REGIME.

Ignacio F. Ranea-Sandoval^{1,2}, Mauro Mariani^{1,2},
Marcos O. Celi^{1,2}, M. Camila Rodríguez^{1,2}, and
Lucas Tonetto^{3,4}

In the past fifteen years, our understanding of compact stars has significantly advanced through key observations, such as the pulsars PSR J0348+0432 and PSR J0740+6620, whose radius has recently been estimated using NICER and XMM-Newton data, along with the analysis of gravitational waves (GW) events, as GW170817.

In this work, we consider polar perturbations, and we calculate the frequency and damping time of the quadrupolar fundamental f -mode of compact objects, constructed using a wide range of model independent hybrid equations of state that include quark matter. We give special attention to the impact of the hadron-quark conversion speed that, in the slow case, gives rise to a branch of slow stable hybrid stars. Moreover, we study the validity of universal relationships proposed in the literature and find out that none of them remains valid when slow stable hybrid stars are taken into account, as has also been shown for the wI -modes and f -modes in Ranea-Sandoval et al. (2022, 2023) respectively. This fact could constrain the applicability of asteroseismology methods with fundamental modes designed to estimate the properties of pulsating compact objects. We hope that this result could be tested with the start up of the third generation gravitational wave observatories, which might shed some light on the f -mode emission from compact objects.

¹ Grupo de Gravitación, Astrofísica y Cosmología, Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, Paseo del Bosque S/N, 1900, La Plata, Argentina.

² CONICET, Godoy Cruz 2290, 1425, CABA, Argentina.

³ Dipartimento di Fisica, “Sapienza” University of Rome, Piazzale A. Moro, 5. 00185 Roma, Italy

⁴ INFN, Sezione di Roma, Piazzale A. Moro, 5. 00185 Roma, Italy

Contact: mceli@fcaglp.unlp.edu.ar

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