

Spanish and Portuguese Relativity Meeting



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I Love *Q*, but δM too

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The *I*-Love-*Q* relations refer to the existence of various approximate equation of state-independent relations involving the moment of inertia, Love number, and quadrupole moment. These relations have an interesting applicability in observational astrophysics since they allow the inference of two quantities within the *I*-Love-*Q* trio out of a third one alone. However, the quantities involved in the *I*-Love-*Q* relations are normalized by the parameter M_0 , which arises in the usual perturbative analytical approach as the mass of the background configuration. However, since M_0 is not the mass of the rotating star M_S , it is not an observable quantity, and therefore the applicability of the relations to actual observations gets tainted. This problem is usually overcome by taking M_0 to be the mass of the star – an approximation that can, in some scenarios, be too risky. In this talk, I will explain how to extract the value of M_0 using an extended version of the universal relations, which includes additional relations involving $\delta M \propto M_S - M_0$, and analyze the extent to which the use of these extended relations provides a more precise inference of the properties of the star, and its equation of state.

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