

# Universal relations for rapidly rotating cold and hot hybrid stars

Various global parameters of compact stars can be related via some empirical relations, that are independent of the equation of state (EOS). These are known as universal relations. They seem to hold for the maximum mass and the corresponding radii of non-rotating and maximally rapidly rotating configurations, as well as their moment of inertia. Numerous studies have focused on the case of hadronic, zero-temperature EOS, as well as some including a first-order phase transition from hadrons to deconfined quark matter in their interior. On the other hand, many astrophysical scenarios, e.g., protoneutron stars that result from core-collapse supernovae and binary neutron star mergers, feature finite temperatures. Therefore, the study of Ref. [1] focused on the universal relations for isentropic hadronic EOS. In this presentation I will discuss the universal relation results obtained in Ref. [2], which is an extension of the previous work including large, representative samples of hadronic and hybrid EOS, i.e., featuring first-order hadron-quark phase transitions, both for zero temperature as well as finite entropy per particle configurations.

## References

- [1] Khadkikar et al, 'Maximum mass of compact stars from gravitational wave events with finite-temperature equations of state', Phys. Rev. C 103, 055811
- [2] Khosravi et al, 'Universal relations for rapidly rotating cold and hot hybrid stars', Mon. Not. R. Astron. Soc. (submitted) arxiv astro-ph.HE/2112.10439

## Length of presentation requested

Oral presentation: 8 min + 2 min questions (Poster-type talk)

## Please select between one and three keywords related to your abstract

Stellar explosions and mergers - theory

## 2nd keyword (optional)

## 3rd keyword (optional)

**Author:** LARGANI, Noshad (University of Wroclaw )

**Presenter:** LARGANI, Noshad (University of Wroclaw )