

Special Issue

Microphysics Meets Astrophysics: Understanding Dense Matter Through Compact Objects

Message from the Guest Editors

Neutron stars are amongst the most extreme objects in the Universe. Hence, these objects can be regarded as natural laboratories in which matter is subject to the most extreme conditions. The matter at the innermost part of their cores can reach values that are over tens of the nuclear saturation density, potentially leading to the occurrence of a hadron–quark phase transition; their magnetic fields can reach above 1015 G at their surfaces. Moreover, some neutron stars rotate more than 1000 times per second. These objects are thus complex and intriguing, and enable us to understand the very nature of particles and the equation of state of dense matter, which remains unknown. Microphysics Meets Astrophysics: Understanding Dense Matter Through Compact Objects aims to provide an overview of research regarding the theoretical modeling and study of neutron and hybrid stars microphysics and astrophysics. In the current era of multi-messenger astronomy using gravitational waves, which began with event GW170817, and the application of data science to basic research, this Special Issue aims to present novel studies that explore these subjects.

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Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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