Special Issue

Symmetries in Compact Stars and Advances in Gravitational Waves—Commemorating 50 Years of the Hulse-Taylor Pulsar

Message from the Guest Editors

Fifty years ago, Russell A. Hulse and Joseph H. Taylor discovered the first binary pulsar, PSR B1913+16, which enabled precision tests of gravity in strong-field regimes and provided the first evidence of gravitational waves. As a cornerstone of modern physics, the concept of symmetry plays a pivotal role in understanding fundamental interactions. Compact stars, such as neutron stars and black holes, serve as ideal laboratories for studying the symmetries of gravitation and particle physics due to their extreme physical conditions. Nowadays, gravitational wave astronomy has become one of the most active research fields, involving detectors ranging from terrestrial to space, and even galactic-scale Pulsar Timing Arrays. These studies offer invaluable insights into gravity, the properties of compact stars, stellar and galaxy evolution, as well as cosmology, dark matter and the early universe. On the occasion of 50 years of the Hulse–Taylor pulsar, this Special Issue aims to gather contributions exploring symmetries in compact stars and recent advances in gravitational wave astronomy. We wish to invite both original and review papers along these lines for this Special Issue.

Guest Editors

Dr. Huanchen Hu

Dr. Kristen Lackeos

Dr. Lijing Shao

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Symmetry
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
symmetry@mdpi.com

mdpi.com/journal/symmetry

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About the Journal

Message from the Editor-in-Chief

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.

Editor-in-Chief

Prof. Dr. Sergei Odintsov
1. ICREA, 08010 Barcelona, Spain
2. Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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