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Symmetries in General Relativity, Gravitation, and Cosmology

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Message from the Guest Editor

General relativity, gravitation, and cosmology are fields where the role of symmetry is quite relevant. Such a property can be used to simplify the treatment of non-trivial problems and help with the obtention of exact solutions. To be more precise, spacetime symmetries were originally used in the study of exact solutions of Einstein's field equations in the context of general relativity, and subsequently, in alternative theories of gravity. It is well known that there are different symmetries, and only after taking advantage of them can we achieve progress. There are several remarkable examples in which the implementation of the idea of symmetry plays a prominent role. For instance, in black hole physics, the well-known Schwarzschild solution can be easily computed after considering spherical symmetry. Similarly, the famous BTZ black hole takes advantage of circular symmetry to make progress in three dimensions. There are also examples where symmetry is the cornerstone in the cosmological context. Thus, in the Special Issue, we aim to focus on the impact of different types of symmetries on black holes and cosmological models.

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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.

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