



Classical and Quantum Phenomena in an Exterior and Interior of the Black Holes

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submissions:

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Message from the Guest Editors

One of the most interesting manifestations of strong gravitational fields is the presence of Black Holes (BHs). An event horizon is a semi-permeable border of a BH. At the event horizon of a Schwarzschild BH, the coordinates r and t interchange their roles: the former becomes temporal and the latter spatial inside the horizon. It reflects particular symmetry properties of spacetime. The time-like Killing vector representing energy conservation outside the horizon becomes a space-like vector inside the horizon representing (t -component) momentum conservation.

We aim to present research in the following topics: Dynamical properties of the interior of BHs; High-energy collisions in the vicinity of the horizon(s); BH physics in modified gravity theories; Radiation reaction near a BH and its application to extreme mass ratio inspirals as astrophysical sources of gravitational waves; Thermodynamics of BHs; Gravitational lensing by BHs; Extensions of the no-hair theorem for the Einstein–Maxwell case to broader applications, including other potential universal characteristics beyond mass, charge, and angular momentum; Particle creation inside BHs; Quantum phenomena in BH physics.





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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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