

## Special Issue

# Advances in Black Holes, Symmetry and Chaos

### Message from the Guest Editor

Black holes, as the most extreme and enigmatic objects in the universe, provide profound insights into the fundamental laws of physics. Their event horizons, singularities, and thermodynamic properties reveal surprising connections between gravity, quantum mechanics, and statistical mechanics. The holographic principle has improved our understanding of black holes, offering a dual perspective through lower-dimensional quantum field theories and uncovering the chaotic nature of black holes. Many quantum systems, particularly those related to black holes, demonstrate chaotic behaviors marked by thermalization, entanglement dynamics, scrambling, and spectral statistics. Quantum chaos bridges the complex dynamics of strongly correlated systems with the semiclassical dynamics near black hole horizons and the contributions of wormhole geometries. Symmetry is crucial for understanding the structure and dynamics of chaotic quantum systems and black holes.

### Guest Editor

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### Deadline for manuscript submissions

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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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