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Symmetry and Primordial Black Hole

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Message from the Guest Editor

Primordial black holes (PBHs) were formed in the early universe due to their large curvature perturbation on small scales when they re-enter the Hubble horizon. The phenomena related to PBHs are very fruitful. They involve the entirety of dark matter, some of the LIGO detections, seeds for galaxy and structure formation, hot spots for baryogenesis, etc. The related physics includes ultra-slow-roll inflation, multifield inflation, stochastic inflation, nonlinearity of the curvature perturbation, pairing and clustering of PBHs in the early universe, phase transition and the change of equation of state, microlensing, Hawking radiation and its remnant, profile of dark matter halo, induced gravitational waves, stochastic gravitational waves from the binary PBHs, etc.

The study of symmetry and primordial black holes continues to play an important role in our ongoing efforts to better understand the fundamental physics of our universe. The aim of this Special Issue is to encourage the publication of original research papers in a wide variety of fields related to PBHs in which theoretical or practical results of symmetry can be applied.

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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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