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Extreme Regimes of Classical and Quantum Gravity Models. Theory, Observations, and the Role of Symmetries

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

General relativity and, more in general, extended theories of gravity provide a geometric formulation of the gravitational interaction.

Reconciling gravity with quantum mechanics is one of the most profound open problems in physics. Over the last few decades, efforts in this direction have led to a broad range of classical and quantum theoretical models which have revealed exciting connections and symmetries between different aspects of gravity and quantum physics. Observational physics also fulfills a crucial role in this field, since it is entrusted with the task of validating the wide variety of proposed models.

Analyzing gravity and its symmetries in the most extreme regimes represents a tool to gain precious information on the classical and quantum aspects of the gravitational interaction. Therefore, this Special Issue is focused on original approaches to the theoretical and/or the observational investigation of either the low-energy or the high-energy regimes of classical and/or quantum gravity theories.

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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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