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New Advance in Dark Energy and Gravity

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Deadline for manuscript submissions:
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Message from the Guest Editor

Dear Colleagues,

We are pleased to invite you to contribute to this Special Issue covering new advances in dark energy and gravity. The direct evidence for the existence of dark energy comes from the expansion history of the universe deduced by modern astronomical observations including (i) the redshift–magnitude relation for type Ia supernovae, (ii) the cosmic microwave background radiation, and (iii) baryon acoustic oscillations. Besides the expansion rate of the universe, the observed large-scale structure of the universe and gravitational lensing of distant galaxies also strongly support the presence of an additional source of gravity that cannot be explained by the matter in the universe.

Theoretically, the simplest model for dark energy is the cosmological constant in Einstein field equations. It is widely believed to be the energy density of empty space. However, according to quantum field theory, the calculated value for this constant is 10^123 times larger than what the astronomical observations indicate. In fact, the energy density of empty space has been proven to have a more reasonable value, zero, in fundamental theories with unbroken supersymmetry...

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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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