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Nature and Origin of Dark Matter and Dark Energy II

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Message from the Guest Editors

Dear Colleagues,

Dark matter and dark energy (DE) represent the two most challenging problems of contemporary physics and astrophysics. DM and DE represents 95% of the matter-energy in the universe and they are not understood. Supporting evidence for DM has been obtained from astronomical observations of the rotation curve of galaxies, the growth of the density fluctuations in the universe, gravitational lenses, Cosmic Microwave Background (CMB) fluctuations, etc.; DE evidence originates from the observed acceleration of the expansion of the universe. For 30 years, studies in particle physics developed in great labs, such as CERN, have not elucidated the natures of DM and DE. On the theoretical side, two main lines have been explored to find the origin of these dark components: the existence of unknown particles, and modifications to fundamental symmetry properties in gravitation theory and cosmology.

This Special Issue is devoted to the presentation of both new results on the observational constraints on DM and DE and to the presentation of new possible theoretical interpretations regarding the nature and origin of the dark components.

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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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