Special Issue

Space-Time Symmetries and Violations of Lorentz Invariance

Message from the Guest Editor

Lorentz invariance is a foundational principle of both the Standard Model of particle physics and of general relativity. However, attempts to reconcile gravity and quantum mechanics suggest Lorentz symmetry may be violated at low energies. Remarkably, minuscule Lorentz violations with roots in Planck-scale physics could be within the experimental reach of current technology. Consequently, violations of Lorentz invariance and the related CPT invariance provide a promising area for discovery. Recent decades have seen a surge of interest in testing Lorentz and CPT symmetries. A steady progression on the theoretical front has yielded a vast landscape of potential Lorentz and CPT violations. Meanwhile, hundreds of high-precision tests of Lorentz and CPT invariance in a wide range of systems have been performed. These include laboratory experiments involving atoms and photons, studies of high-energy particles from accelerators and the cosmos, observations of photons, neutrinos, and gravitational waves from astrophysical sources, and tests of gravity in the laboratory and in space. This Special Issue explores all aspects of this exciting and growing field.

Guest Editor

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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.

Editor-in-Chief

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