

Special Issue

Symmetry/Asymmetry in Quantum Theory of Gravity

Message from the Guest Editor

Symmetries are at the origin of the modern comprehension of fundamental interactions in physics. Internal symmetries both dictate the dynamics of the degrees of freedom of quantum systems and specify how such systems interact. External symmetries—more precisely, diffeomorphism symmetries—provide strong constraints on physical observables, as accurately confirmed by a plethora of high-precision experiments. Our comprehension of quantum gravity models is thus intertwined with the fate of symmetries at high-energy (Planckian) scales. At the same time, the breakdown of global symmetries in quantum gravity might also lead to stringent phenomenological predictions that have observable implications on the mass spectroscopy of dark matter candidates. The reconceptualization of quantum theory in informational terms suggests, on the other hand, that all classical information, including the local values of spacetime curvature, results from breaking a symmetry. This offers an appealing scenario in which the structure of spacetime itself could be emergent via a decoherence process or quantum field condensation...

Guest Editor

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Deadline for manuscript submissions

closed (28 February 2023)



Symmetry

an Open Access Journal
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Impact Factor 2.2
CiteScore 5.3



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About the Journal

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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