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Symmetry with Gravity and Particle Theories

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Deadline for manuscript submissions:
closed (30 November 2020)

Message from the Guest Editors

Dear Colleagues,

Symmetry is the most important guiding principle for constructing realistic theories of gravity and particles. Gauge symmetries, that is, local symmetries, play the main role in obtaining consistent quantum theories for the models of particles with a spin of greater than or equal to one, such as with gauge particles and graviton. Furthermore, gauge symmetries strongly restrict the models. On the other hand, many global symmetries appear in low-energy effective theories, although there seems to be no exact global symmetry, which is broken either spontaneously or explicitly. Low energy symmetries may also appear emergently.

In our Special Issue on “Symmetry with Gravity and Particle Theories”, we review the role of symmetries in gravity and particle theories, origins of symmetries, mechanisms of breakdown, relations between the symmetries, and other related topics.

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Prof. Dr. Taishi Katsuragawa
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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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Journal Rank: JCR - Q2 (*Multidisciplinary Sciences*) / CiteScore - Q1 (General Mathematics)

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