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Relativity Based on Symmetry

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

The space-time symmetry resulting from the Galilean principle of relativity is the basis for the Lorentz transformations in special relativity (SR). These transformations are uniquely defined from this symmetry and the assumption of the constancy of the speed of light in inertial systems or some weaker assumptions.

The domain *D* of all relativistically admissible velocities in SR is a bounded symmetric domain, meaning that for any point in *D*, there is a one-to one map *S* of *D* onto itself such that S^2=Id and *S* fixes only this point. The map *S* is affine o n *D*, but if we use an alternative way of describing the relative motion of objects—the symmetric velocities—the corresponding domain is symmetric with respect to the conformal transformations. This description leads to a spin-half representation of the Lorentz group and is useful to obtain analytic solutions of the relativistic dynamics equation.

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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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