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Gravitational Waves

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Message from the Guest Editor

Direct observation of gravitational waves in 2015 marked the beginning of a new era in physics and astronomy. Objects in the sky, such as binary black holes, which are not visible in conventional electromagnetic spectrum, have recently been observed via gravitational waves that they emit during the

Gravitational waves are minute perturbations of the geometry of space-time which propagate through space with the speed of light. To describe the propagation of gravitational waves and their effect on the detector one has to choose a certain coordinate system. One of the most frequently used coordinate systems is associated with the transverse and traceless gauge in which the gravitational wave is represented by a symmetric, transverse and traceless tensor of the metric perturbation. Gravitational waves can also be described in the Fermi normal coordinate system which is built around the worldline of inertial observer. Other coordinate systems may be more suitable for the analysis of gravitational waves because of the symmetries they manifest.

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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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