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Acceleration and Radiation: Classical and Quantum, Electromagnetic and Gravitational

Guest Editor:

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Message from the Guest Editor

The process of radiation by a uniformly accelerated charge, although both fundamental and elementary, has long been a subject of controversy. The conceptual issues are intensified when gravity is brought into the picture, and they have come even more to the fore now that a related effect in quantum theory (named after Unruh), which usually deals with a neutral system with internal degrees of freedom rather than a charge, has attracted sustained attention and has a close relation to the Hawking effect of black-hole evaporation. These issues also have implications for two major current experimental projects: LIGO (for the detection of gravitational waves) and DUNE (for the study of neutrino mixing). Furthermore, Unruh-like effects in the behavior of atoms falling into a black hole are a topic of current research uniting general-relativity and quantum-optics researchers. The crucial (and counterintuitive) point in these various situations is that the acceleration of the observer, or measuring instrument, is as relevant as that of the source. The time has come to consolidate a world-wide consensus in this important, and unnecessarily confused, area.

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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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