Special Issue

Contributions to the Study of Post-Maxwellian Electrodynamics

Message from the Guest Editors

The phenomenon of vacuum polarization in quantum electrodynamics (QED) is a well-known consequence of the polarization of virtual electron–positron pairs. This effect leads to non-linear interactions between electromagnetic fields and has been a fascinating research topic, as in the early days of QED. A key issue in this context is the scattering of photons by photons, which has significant implications, including vacuum birefringence and vacuum dichroism. Meanwhile, despite considerable advancements in research, experimental confirmation of this prediction is still elusive. Interestingly, it is worth recalling here that the ATLAS and CMS collaborations at the Large Hadron Collider (LHC) recently reported the emission of high-energy gamma–gamma pairs resulting from virtual gamma–gamma scattering in ultraperipheral Pb–Pb collisions. New laser facilities have also generated interest in this area by measuring the scattering of intense laser pulses. Thus, exploring further observational signatures of different nonlinear Electrodynamics models in vacuum could be beneficial.

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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.

Editor-in-Chief

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