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Physics Potential of the Muon Collider

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Message from the Guest Editors

A muon collider has great potential to explore the high energy frontier. A multi-TeV machine with sufficient luminosity will be a great opportunity to probe the most intimate nature of the Standard Model and the Electroweak Symmetry Breaking mechanism, and to detect new physics both directly and indirectly. At the baseline energies and luminosities a large number of Higgs bosons will be produced mainly through the Vector Boson Fusion (VFB) processes, complementing the study performed at low energy Higgs factories (e+e-) where the main Higgs production mode would be Higgsstrahlung. The muon collider would allow the precise measurement of the Higgs couplings to several SM particles and offer the unique opportunity for the measurement of the trilinear and quadrilinear Higgs couplings. The search for new physics is the main strength of a muon collider running at multi-TeV energies: different SUSY-inspired models and WIMP dark matter scenarios can be explored. Moreover a muon collider operating at very high luminosity poses design challenges that require the development of innovative concepts and technologies.

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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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