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Interplay of QCD, Cosmology and Astroparticle Physics

Guest Editor:

Prof. Dr. Carlos Pajares

University of Santiago de
Compostela, Spain

Deadline for manuscript
submissions:

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Message from the Guest Editor

Dear Colleagues,

Quantum Chromodynamics (QCD) encodes a large richness of physical phenomena, and is intensively studied theoretically and experimentally. However, in spite of its success, some of its aspects are not yet fully understood; there remain open questions that demand answers. Most of these questions have important implications in cosmology and astroparticle physics.

The QCD Lagrangian contains ingredients that can clarify key questions concerning cosmology. The term, which breaks conformal symmetry, even in the massless case, is related to the axion field and its search concerns the nature of dark matter and also could contribute to the cosmological constant. Other possibilities of dark matter have been speculated, such as the existence of exotic hadrons made of color-octet complexes. The mentioned term, which is not CP invariant, plays an important role in the equation of the state of the deconfinement transition from hadronic matter to quark gluon matter, such as what happened in the first moments of the Universe after the Big Bang. This term is proportional to the trace anomaly, which measures the departure from a free quark-gluon gas of the obtained strongly-coupled quark gluon matter, and is also related to vacuum structure. [...]



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Special Issue



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Editor-in-Chief

Prof. Dr. Lorenzo Iorio

Ministero dell'Istruzione e del Merito, Viale Unità di Italia 68,
70125 Bari, BA, Italy

Message from the Editor-in-Chief

The multidisciplinary *Universe* journal is aiming to follow and, hopefully, to lead to the largest extent as possible the ever-self renovating threads which weave mathematical theories with our understanding of the magnificent natural world. On behalf of all the distinguished members of the editorial board, I extend my welcome to this new journal and look forward to hearing from the interested contributors and learning about their valuable research.

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Universe Editorial Office
MDPI, St. Alban-Anlage 66
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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