

## Special Issue

# Interplay of QCD, Cosmology and Astroparticle Physics

### Message from the Guest Editor

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. [...]

### Guest Editor

Prof. Dr. Carlos Pajares  
Univeristy of Santiago de Compostela, Spain

### Deadline for manuscript submissions

closed (31 March 2019)



## Universe

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## About the Journal

### Message from the Editor-in-Chief

The multidisciplinary journal *Universe* 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 Advisory and Editorial Boards, I extend my welcome to this journal and look forward to hearing from the interested contributors and learning about their valuable research.

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### Editor-in-Chief

Prof. Dr. Lorenzo Iorio  
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