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Perturbative Methods in Gravity Theory

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Deadline for manuscript submissions:
closed (31 January 2022)

Message from the Guest Editor

The theory of small perturbations around a given exact background solution, with the aim of constructing approximate solutions by a perturbative expansion of a set of field equations, is one of the most important tools employed in the study of gravity theories. In the most simple case, the background solution is assumed to be maximally symmetric, such as Minkowski spacetime, leading to the well-known Newtonian and post-Newtonian approximations, as well as the description of gravitational waves. Relaxing the symmetry to only spatial homogeneity and isotropy leads to the theory of cosmological perturbations, which is the most important framework for assessing the viability of cosmological models using precision observations such as the angular spectrum of the cosmic microwave background. Another application, which has gained a significant amount of importance with the possibility of observing gravitational waves, is the perturbation of black hole spacetimes, which is used to model the gravitational waves emitted during the inspiral and ringdown phases of a merger event.

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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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