量子物理学・ナノサイエンス第 275 回セミナー

Cosmic String Networks and Gravitational Waves

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日程　：　11 月 22 日(金) 16:00-18:00

場所　：　本館 1 階 156 物理学系輪講室

概　要

In this talk we will review how cosmic strings appear as solitonic solutions in many models of high energy physics beyond the standard model. We will also describe their cosmological formation in phase transitions as well as the large scale dynamics of these networks of strings. Furthermore, we will show how one can extract important information about the statistical distribution of these networks by performing large scale cosmological simulations based on the Nambu-Goto dynamics of strings. Using these results we will explain how to compute the expected stochastic gravitational wave background in these scenarios paying particular attention to the distribution of string loops at formation as well as their evolution throughout their finite lifetime. Finally we will describe current efforts to take into account gravitational backreaction during the string evolution and its impact on the gravitational wave signals. We will conclude with a description of the bounds on the cosmic string energy scale based on the current limits set by the latest pulsar timing array (PTA) as well as the projected from future gravitational wave observatories.

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