



复旦大学物理系 物质科学报告

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Introduction to the non-singular bounce cosmology

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The hot big bang cosmology, while is a successful theory in describing our Universe, suffers from several conceptual problems if we trace back to the earliest moments near the big bang. These severe issues have been delicately addressed by inflationary cosmology, which was proposed in 1980s and now has become the prevailing paradigm of the very early Universe. However, the spacetime singularity, which appeared at the moment of the birth of the Universe, remains to be a long-standing question in modern cosmology. Non-singular bounce cosmology is a novel theoretical paradigm of the very early Universe, which aims at solving the initial big bang singularity. Although as beautiful as it looks like, the associated model building is a long-termed journey full of challenges from the theoretical and observational aspects. I will give an overview of this cosmological paradigm and introduce the major efforts that cosmologists have made in past research. At the end I would state my point of view on the new adventure in the future study in this field.



蔡一夫，男，1986年生。2010年于中国科学院高能物理研究所获得理学博士；2010年9月至2012年8月在美国亚利桑那州立大学第一期博士后；2012年9月至2015年5月在加拿大麦吉尔大学第二期博士后。2015年5月通过入选中组部青年千人计划引进回国，现任中国科学技术大学物理学院天文系教授。2017年获得国家自然科学基金委优青资助。研究领域是粒子宇宙学，重点集中在暴胀宇宙，反弹宇宙，大尺度结构的早期演化，以及当前宇宙加速膨胀的动力学性质等方面。相关工作得到国际同行的关注，并多次在国际媒体上报道。在国际主流期刊上发表学术论文90余篇，包括 *Physics Reports*、*Reports on Progress in Physics*、*Nature Communications*、*Physical Review Letters*、以及入选2009年中国百篇最具影响国际学术论文。据国际通用的INSPIRE数据库统计，发表论文

总引用约4700余次，其中单篇最高400余次，引用在100次以上的论文有10篇，H因子为38。

