SPeCial4Young

SYSU-PKU Collider physics forum For Young scientists

中山-北大联合高能物理青年论坛第二十一期

自希格斯玻色子发现后，标准模型预言的粒子都已被找到。然而近些年来，在实验中发现越来越多与标准模型不符合的迹象，例如中微子质量、轻子味道普适性破坏以及CDF实验测量W玻色子质量反常等问题。这些“乌云”催促我们去寻找标准模型之外的新物理。高能物理界提出了各种不同的未来实验项目，例如基于LHC对撞机的升级计划（HL-LHC、HE-LHC）、未来环形对撞机（FCC、SPPC）、国际直线对撞机（ILC）、紧凑型直线对撞机（CLIC）、环形正负电子对撞机（CEPC）、缪子对撞机（MuC）、电子-缪子乃至电子-中微子对撞机等。

本论坛目的在于为高能物理工作者提供平台交流其在高能物理前沿的进展与经验，包括但不限于对撞机技术、软件模拟、物理分析等，同时也为高年级本科生及研究生提供接触高能物理前沿的机会。

报告题目： **Opening up window of post-inflationary QCD axion**

摘要： The QCD axion cosmology depends crucially on whether the QCD axion is present during inflation or not. We point out that contrary to the standard criterion, the Peccei-Quinn (PQ) symmetry could remain unbroken during inflation, even when the axion decay constant, f_a, is (much) above the inflationary Hubble scale, H_I. This is achieved through the heavy-lifting of the PQ scalar field due to its leading non-renormalizable interaction with the inflaton, encoded in a high-dimensional operator which respects the approximate shift symmetry of the inflaton. The mechanism opens up a new window for the post-inflationary QCD axion and significantly enlarges the parameter space, in which the QCD axion dark matter with $f_a > H_I$ could be compatible with high-scale inflation and free from constraints on axion isocurvature perturbations. There also exist non-derivative couplings, which still keep the inflaton shift symmetry breaking under control, to achieve the heavy-lifting of the PQ field during inflation. Additionally, by introducing an early matter domination era, more parameter space of high f_a could yield the observed DM abundance.

报告人简介： Lingfeng Li（李凌风）received his BS in Chemistry and Physics in 2013 from Peking University, followed by his PhD in Theoretical High Energy Physics from University of California, Davis in 2018 under the supervision of Prof. Hsin-Chia Cheng. Then he joined HKUST IAS as a Postdoctoral Fellow till 2021. Currently, he works as a postdoc at Brown University. He is interested in various models that leave all sorts of signatures in collider phenomenology, cosmology and astrophysics."

时间： 10月26日 周三 19：00 ---19：30，线上

会议ID： 487 887 1035（Zoom）Passcode：527772

Indico: https://indico.ihep.ac.cn/event/17770/

Meeting link: https://cern.zoom.us/j/4878871035?pwd=SjJuekR3cnBueUx3Y1pvUzl6QkZNUT09

组织人：尤郑昀（中山大学） 李强（北京大学） 卢梦（中山大学） 李静舒（中山大学）