

CPV in charm decays at Belle II



Speaker: Dr. Yifan Jin
Host: Prof. Miao He
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Abstract:

Charge-Parity violation (CPV) plays a fundamental role in modern physics. It was first experimentally discovered in kaon decays in 1964 at BNL. The underlying mechanism was established only in the 2000s, when the Kobayashi-Maskawa theory was verified through studies of B mesons at the Belle and BaBar experiments.

In the charm sector, however, the Standard Model predicts that CPV should be very small. The first observation of CP violation in charm decays was reported only recently, in 2019 by the LHCb experiment. CPV in charm decays thus serves as a sensitive probe for new physics, particularly if the observed violation exceeds predictions from the Kobayashi-Maskawa mechanism.

In this presentation, I will report on two analyses of CP violation in charm decays based on data collected by the Belle II experiment, carried out by me and my collaborators. I will also introduce our detector R&D efforts that will support and enhance these measurements.

About the speaker:

Yifan Jin is a postdoc researcher at Brookhaven National Laboratory. He received his B.S. degree from Shanghai Jiao Tong University in 2013, followed by M.S. and Ph.D. degrees from The University of Tokyo in 2015 and 2018. His research focuses on detector R&D and physics analyses at collider experiments. During his graduate studies at The University of Tokyo, he demonstrated the feasibility of using avalanche photodiodes to read out pure CsI crystals for electromagnetic calorimeters at future high-luminosity experiments. He also independently conducted searches for rare tau-lepton decays using data collected by the Belle experiment. He subsequently joined INFN Trieste as a postdoctoral researcher, where he made significant contributions to the development and performance optimization of the diamond-based beam-loss monitor system for Belle II experiment. He then moved to Brookhaven National Laboratory, where he independently conducted a search for charge-parity violation in charm meson decays using Belle II data. In parallel, he has been characterizing a novel microchannel-plate photomultiplier tube for particle identification systems envisioned for the Electron-Ion Collider and the Belle II detector upgrade.