



复旦大学物理系 物质科学报告

Time: 2:00pm, Tuesday, 2019.12.03

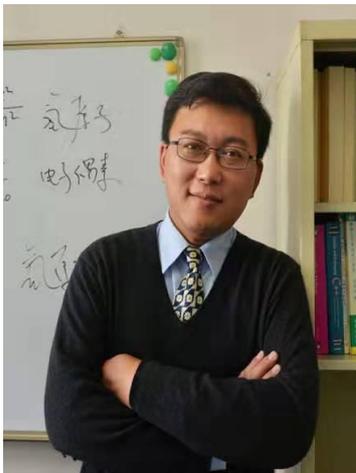
Location: Room C108, Jiangwan Physics Building

Title: Precision hyperon physics at BESIII

Speaker: Hai-Bo Li (IHEP)

Abstract: The CKM mechanism for CP violation in the Standard Model (SM) fails to explain the matter-antimatter asymmetry of the Universe by more than 10 orders-of-magnitude. This suggests that additional CP violating processes occur, and motivates aggressive searches for new, non-SM sources of CP violation. To date, CP violation in hyperon decays have never been observed. Standard Model CP violations in hyperon decays are expected to be $\sim 10^{-4}$ to 10^{-5} , and any value higher than this level would be a signature of new, beyond the SM physics.

Currently BESIII has collected about 10 billion J/ψ decay events, the decay rate of J/ψ to hyperon-anti-hyperon pairs are 10^{-3} , which indicates that the produced hyperon pairs will be a few millions. In this talk I will present the first observation of transverse polarization of hyperon-anti-hyperon from the $e^+e^- \rightarrow J/\psi \rightarrow$ hyperon-anti-hyperon pairs, which allows us to measure the decay asymmetry parameters of both hyperon and anti-hyperon, therefore CP asymmetry in the hyperon decay can be precisely obtained with 5 dimensional fit to data. We expect that the study of hyperon physics will be the next frontier of the SM CP searches.



Prof. Li obtained his Ph.D degree from IHEP in China, in 1998. Then he joined CERN ALEPH experiment as a CERN Asia Fellow in 1999. In 2001, as a research associate from University Wisconsin at Madison, he joined BaBar experiment at its earlier stage. He worked on the measurements of CP violation in the B decay, and finished the first measurement of $\sin(2\alpha)_{\text{effective}}$, which is a milestone of CPV in B decay. In 2005, he joined BESIII experiment, and worked on the BESIII physics book and preparation of BESIII physics before its starting in 2009. Then as the first physics analysis coordinator of BESIII Collaboration, he pushed the first publication of BESIII paper. In 2012, a group from IHEP joined COMET experiment to work on the physics of muon to electron conversion, he is the leader of COMET group in China now.