

BESIII 上超子物理及其 CP 破坏实验研究进展

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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.

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