

Contribution ID: 25

Type: Oral presentation

Discrete symmetry tests using hyperon-antihyperon pairs at BESIII

Tuesday 30 August 2022 09:00 (30 minutes)

The hyperons from charmonia decays are produced with a non-zero spin polarization that is described by one global parameter in electron-positron annihilation into hyperon-antihyperon pair. This provides a method to measure precisely parity-violating (anti)hyperon decay amplitudes and directly test CP violation. These CP tests were performed for J/psi decays into Lambda Lambdabar, Sigma+ Sigmabar-, Xi Xibar and psi(2S) into Omega- Omega-bar+. For the Xi -> Lambda pi decay chain, the exclusive measurement allows for three independent CP tests and the determination of the strong and weak phase differences. Thanks to the large datasets in the tau-mass region, including the world's largest data samples at the J/psi and psi(2S) resonances collected at the BESIII experiment, the multi-dimensional analyses making use of polarization and entanglement have been performed for these processes. In the presentation the methods, the recent BESIII results and a roadmap for further CP-violation studies in hyperon decays will be discussed.

Scientific topic

Symmetries

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