Contribution ID: **594** Type: **Parallel Talk**

Two-Particle Correlations of Hadrons in e^+e^- Collisions at Belle

Saturday, 9 July 2022 17:35 (15 minutes)

We present the measurement of two-particle angular correlations in hadronic e^+e^- collisions data collected by the Belle detector at KEKB. Two high-statistics datasets, with center-of-mass energies $\sqrt{s} = 10.52$ GeV (89.5 fb^{-1}) and 10.58 GeV on the $\Upsilon(4S)$ resonance (333.2 fb^{-1}), are analyzed. In various heavy-ion and proton-proton collisions, "ridgelike signals"were reported in the correlation function analysis. The physical origin of the flow-like signals is still under debate. This enhancement is a phenomenon in that charged track pairs tend to have small azimuthal angle differences, and the azimuthal correlation extends to phase space with large pseudorapidity differences between the two tracks. The study of the clean e^+e^- collision system can be an important test for theories attributing ridgelike correlations to initial-state effects. The results are compared with Monte Carlo simulations to give qualitative physical understandings. Moreover, the measurement constraints phenomenological models of parton fragmentation in the low-energy regime. The study on the resonance $b\bar{b}$ bound state decays also sheds light on the formation of particular correlation structures.

In-person participation

Yes

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Session Classification: Heavy Ions

Track Classification: Heavy Ions