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Tau-lepton Mass Peak Reconstruction at the Future Circular Collider electron-positron (FCC-ee)

We present a novel tau-lepton mass reconstruction method for the projected Future Circular Collider electron-positron (FCC-ee) at CERN. Profiting from the enormous statistics and the excellent beam spot and vertex detector resolutions expected in this electroweak factory, a tau-lepton mass peak reconstruction is within reach for the first time, at the Z-pole stage. A comprehensive comparison between this novel method and the pseudomass method used by the Belle II collaboration in 2023 is presented. The statistical uncertainty of the method is addressed for the decay channel $\tau^- \to \pi^-\pi + \pi^-\nu_\tau$, while various contributions to the systematic uncertainty of the measurement are delimited.

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