Contribution ID: **36** Type: **not specified**

Lepton Flavor Violation at Electron-Positron Colliders

Monday 8 May 2023 15:15 (15 minutes)

Lepton Flavor Violation (LFV) is one of the cleanest probes of Beyond the Standard Model (BSM) Physics. In this work, we explore the sensitivity of the channel $e^+e^- \to \tau\mu$ to BSM physics above the $\sim$ TeV scale at the proposed circular electron-positron collider FCC-ee. We compute the expected cross-section $\sigma(e^+e^- \to \tau\mu)$ in the Standard Model Effective Field Theory (SMEFT) framework and assess the backgrounds to set constraints on the size of the SMEFT operators. If present, these operators also contribute to LFV tau decays at lower energies.
We find that the limits on individual operators (or on the New Physics (NP) scale Λ) from the FCC-ee are comparable to those obtained from low-energy tau decays (except for the dipole operators). In addition, we illustrate the complementarity between the sensitivities of these different processes when more than one SMEFT operator is turned on at the NP scale.

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Session Classification: BSM II

Track Classification: BSM