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Charged lepton flavor violation at circular e^+e^- colliders

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Lepton flavor violation is one of the cleanest probes of physics beyond the standard model. In this work, we explore the sensitivity of the process $e^+e^- \rightarrow \tau\mu$ to new physics above the TeV scale at the proposed circular electron-positron colliders FCC-ee and CEPC. We compute the $e^+e^- \rightarrow \tau\mu$ cross-section in the Standard Model Effective Field Theory and assess the relevant backgrounds. We compare our sensitivity projections to existing and expected constraints from tau decays and Z decays and find that the future electron-positron colliders provide competitive probes of new physics. We highlight the complementarity of searches for resonant $e^+e^- \rightarrow Z \rightarrow \tau\mu$ production on the Z pole and searches for non resonant $e^+e^- \rightarrow \tau\mu$ at higher center-of-mass energies.

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