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Status of Radiative Corrections and Monte Carlo Generators for low-energy e^+e^- into leptons and hadrons final states: the RadioMonteCarLow2 effort.

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Robust and precise Monte Carlo generators are paramount to the analysis of low-energy e^+e^- scattering experiments at electron-positron colliders, which are essential for precision tests of the Standard Model, such as the dispersive evaluation of the hadronic vacuum polarization contribution to the muon $g-2$. As part of the community-driven initiative RadioMonteCarLow2, we aim to collect these Monte Carlo tools and facilitate their access. This initiative has been working on providing the community with codes that are able to produce differential cross-section distributions for processes related to $e^+e^- \rightarrow$ leptons and hadrons at center-of-mass energies of a few GeV. In this talk, I will report on the results of Phase I of this effort, published as arXiv:2410.22882, which presents a detailed comparison of Monte Carlo codes for e^+e^- scattering into muon, pion, and electron pairs, both for energy-scan and radiative-return experiments. This first phase is a theoretical study which focuses on comparisons without reference to experimental data, aiming to clarify the importance of different physics effects and approaches in realistic experimental setups.

Secondary track

T05 - QCD and Hadronic Physics

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