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High-precision QCD physics at FCC-ee

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The Future Circular Collider (FCC) is a post-LHC project aiming at direct and indirect searches for physics beyond the SM in a new 100 km tunnel at CERN. In addition, the FCC-ee offers unique possibilities for high-precision studies of the strong interaction in the clean environment provided by e+e- collisions, thanks to its broad span of center-of-mass energies ranging from the Z pole to the top-pair threshold, and its huge integrated luminosities yielding 10^{12} and 10^{8} jets from Z and W bosons decays, respectively, as well as 10^{5} pure gluon jets from Higgs boson decays. In this contribution, we will summarize studies on the impact the FCC-ee will have on our knowledge of the strong force including: (i) QCD coupling extractions with permil uncertainties, (ii) parton radiation and parton-to-hadron fragmentation functions, (iii) jet properties (ligh-quark-gluon discrimination, e+e- event shapes and multijet rates, jet substructure, etc.), (iii) heavy-quark jets (dead cone effect, charm-bottom separation, gluon-to-cc, bb splitting, etc.); and (iv) nonperturbative QCD phenomena (color reconnection, baryon and strangeness production, Bose-Einstein and Fermi-Dirac final-state correlations…).

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