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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 91-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 $O(5 \times 10^{12})$ and $O(2 \times 10^8)$ jets from Z and W bosons decays respectively, $O(2 \times 10^5)$ pure gluon jets from Higgs boson decays, as well as $O(2 \times 10^6)$ top quarks. In this contribution, we will summarize the impact that the FCC-ee will have on our improved knowledge of the strong force including: (i) QCD coupling determinations with permil uncertainties, (ii) ultraprecise studies of parton radiation and jet properties (light-quark/heavy-quark/gluon discrimination, jet substructure, etc.); and (iii) accurate scrutiny of nonperturbative QCD phenomena (color reconnection, hadronization, final-state hadron interactions,...).

Collaboration / Activity

FCC-ee

Primary author: PLÄTZER, Simon (Uni Graz)

Co-author: D'ENTERRIA, David (CERN)

Presenter: PLÄTZER, Simon (Uni Graz)

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