

# Phenomenology 2021 Symposium



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## Mixed EW-QCD three-loop leading fermionic corrections to electroweak precision observables

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Measurements of electroweak precision observables at future electron-positron colliders, such as the CEPC, FCC-ee, and ILC, will be sensitive to physics at multi-TeV scales. To achieve this sensitivity, precise predictions for the Standard Model expectations of these observables are needed, including corrections at the three- and four-loop level. In this article, results are presented for the calculation of a subset of three-loop mixed electroweak-QCD corrections, stemming from diagrams with a gluon exchange and two closed fermion loops. The numerical impact of these corrections is illustrated for a number of applications: the prediction of the W-boson mass from the Fermi constant, the effective weak mixing angle, and the partial and total widths of the Z boson. Two alternative renormalization schemes for the top-quark mass are considered, on-shell and  $\overline{\text{MS}}$ .

### Summary

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