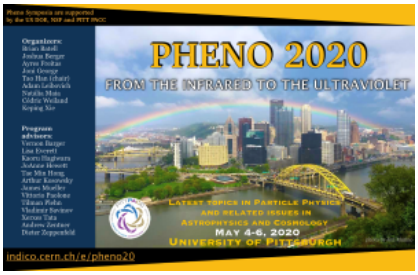

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Leading Fermionic Three-Loop Corrections to Electroweak Precision Observables

Monday 4 May 2020 14:30 (15 minutes)

Future electron-position colliders, such as CEPC and FCC-ee, have the capability to dramatically improve the experimental precision for W and Z-boson masses and couplings. This would enable indirect probes of physics beyond the Standard Model at multi-TeV scales. For this purpose, one must complement the experimental measurements with equally precise calculations for the theoretical predictions of these quantities within the Standard Model, including three-loop electroweak corrections. This article reports on the calculation of a subset of these corrections, stemming from diagrams with three closed fermion loops to the following quantities: the prediction of the W-boson mass from the Fermi constant, the effective weak mixing angle, and partial and total widths of the Z boson. The numerical size of these corrections is relatively modest, but non-negligible compared to the precision targets of future colliders. In passing, an error is identified in previous results for the two-loop corrections to the Z width, with a small yet non-zero numerical impact.

Summary

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