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Towards two-loop EW corrections at NLL in OpenLoops

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At energies above the Electroweak (EW) scale, higher-order EW corrections exhibit a logarithmic enhancement which is driven by the ratio of the typical scattering energy to the gauge-boson mass. At next-to-leading order (NLO) these corrections lead to factors amounting to several tens of percent in tails of kinematic distributions of crucial LHC processes, and still contribute a few percent at next-to-next-to-leading order (NNLO). As such, their inclusion is essential to reduce theoretical uncertainties arising from missing higher-order corrections.
In this talk, I will review the key features of the algorithm implemented in OpenLoops (OL) for calculating one-loop EW corrections in the logarithmic Sudakov approximation, namely at next-to-leading logarithmic (NLL) accuracy, and present the status towards its extension to the two-loop level. This approximation efficiently implements the Denner-Pozzorini algorithm using an effective vertex approach, enabling to reproduce the full one- and two-loop results with percent-level accuracy while preserving tree-level computational complexity.

Author: MAI, Lorenzo (University of Genova)

Presenter: MAI, Lorenzo (University of Genova)

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