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YFS Resummation in SHERPA

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The proposed physics programs at future lepton colliders will deliver a level of experimental precision that is unseen in our field. To ensure a successful physics program, significant improvements are needed in theoretical calculations to reach or surpass the experimental accuracy. One such theoretical avenue that can be improved is the treatment of electroweak radiative corrections in lepton-initiated processes. These corrections, in particular the QED contribution, can lead to large logarithmic enhancements in regions of the phasespace that experiments will probe. In this talk, I will present an update on Sherpa's implementation of the Yennie-Frautschi-Suura resummation, where all soft logarithms are resummed to infinite order, and I will also discuss its matching to one-loop and two-loop electroweak corrections. The inclusion of one-loop corrections has been semi-automated within the Sherpa framework while the inclusion of two-loop amplitudes is highly process dependent. However, with the recent advances in two-loop electroweak corrections, some preliminary results are available.

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