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# External-leg corrections as an origin of large logarithms

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Obtaining precise theoretical predictions for both production and decay processes of heavy new particles is of paramount importance to constrain the allowed parameter space of BSM models and to properly assess the sensitivity for discoveries and for discriminating between different BSM scenarios. In this context, it is well known that large logarithmic corrections can appear in the presence of widely separated mass scales.
In this talk, I will point out the existence of a new class of possible large, Sudakov-like, logarithms, appearing in external-leg corrections of heavy scalars. In constrast to usual Sudakov logarithms, these can furthermore potentially be enhanced by large trilinear couplings. I will show that such large logarithms are associated with infrared singularities and examine several techniques to address these. In addition to a discussion at one loop, I will also present the derivation of the two-loop corrections containing this type of large logarithms, pointing out in this context the importance of adopting an on-shell renormalisation scheme. I will illustrate this discussion with examples of decay processes involving heavy scalars in the Minimal Supersymmetric Standard Model (MSSM) and the singlet-extended Two-Higgs-Doublet Model (N2HDM).

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