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Probing the $\mathcal{O}(1/\Lambda^4)$ effects on Drell-Yan process at the LHC

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We study the $\mathcal{O}(1/\Lambda^4)$ effects on Drell-Yan process within the framework of the Standard Model Effective Field Theory (SMEFT). By analysing the high energy behavior of the cross sections as functions of SMEFT expansion parameters $\{s, v^2\}/\Lambda^4$, we select operators with dominating contribution to the cross sections at higher scale. The dependence of the cross section on a large operator basis is then vastly reduced. We survey the sensitivity of different operators toward higher scales. We perform fits to the LHC data, as well as HL-LHC pseudo-data. We then discuss the impact of dimension-8 effects to the bounds on dimension-6 Wilson coefficients. The inclusion of both dimension-6 squared terms and dimension-8 terms has significant effects on the fits.

Authors: PETRIELLO, Frank (Northwestern University and Argonne National Lab); BOUGHEZAL, Radja (Argonne National Laboratory); Dr HUANG, Yingsheng (Northwestern University & Argonne National Laboratory)

Presenter: Dr HUANG, Yingsheng (Northwestern University & Argonne National Laboratory)

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