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AFB in High Invariant-Mass Drell-Yan: Implications for SMEFT Fits

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We study the impact of LHC forward-backward asymmetry (AFB) measurements at high invariant mass in the Drell-Yan process on probes of semi-leptonic four-fermion operators in the Standard Model effective field theory (SMEFT). In particular, we study whether AFB measurements can resolve degeneracies in the Wilson coefficient parameter space that appear when considering invariant mass and rapidity measurements alone. We perform detailed fits of the available high energy and high luminosity ATLAS and CMS data for both invariant mass distributions and AFB. While each type of measurement separately exhibits degeneracies, combining them removes these blind spots in some cases. In other situations it does not, highlighting the importance of incorporating future data sets from other experiments to fully explore this sector of the SMEFT. We investigate the impact of contributions quadratic in the Wilson coefficients on the description of Drell-Yan data, and discuss when such terms are important in joint fits of the AFB and invariant mass data.

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

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

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