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Reducing the PDF uncertainty in the extraction of $\sin^2\theta_{eff}$ from the CMS measurements of the forward -backward asymmetry in Drell-Yan dileptons events at 13 TeV

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Recently, the CMS collaboration published measurements of the forward-backward asymmetry (angular coefficient $A_4(M)$)) in Drell–Yan dilepton production in proton-proton collisions at $\sqrt{s} = 13$ TeV, and $\sin^2\theta_{eff}$ was extracted from A_4 using a several parton distribution functions (PDFs). The PDF errors, as well as the differences between $\sin^2\theta_{eff}$ values extracted using different PDF sets, are reduced by using PDF profiling which relies on the dilepton mass dependence of A_4. None-the-less even after profiling there is still a difference of one standard deviation between the values extracted with the CT18Z, NNPDF4.0 and MSHT20 PDF' s indicating that there is a residual difference in some of the parton distributions after A_4 profiling. In this presentation we report on the extraction of the EW mixing angle from the CMS measurement of A_4 with XFITTER using a large number of PDF sets , and investigate which PDF distributions are responsible for the residual difference, and if the difference can be reduced by including additional new data in the profiling including W+charm production at 13 TeV (which further constrains the $s - \bar{s}$ quark distribution) and charged lepton asymmetry in W decays at 13 TeV (which further constrains the $u - \bar{u}$ and $d - \bar{d}$ quark distributions).

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