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Using Drell-Yan forward-backward asymmetry to constrain Parton Distribution Functions

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We show that measurements of the forward-backward charge asymmetry $(A_{FB}(M))$ of Drell-Yan dilepton events produced at hadron colliders can be used to constrain Parton Distribution Functions (PDFs). PDF uncertainties are the dominant systematic error in the extraction of of electroweak parameters from hadron collider data. These parameters include the electroweak mixing angles $(\sin^2 \theta_{eff}^{lept}(M_Z), \text{ and } \sin^2 \theta_W)$ and the mass of the W boson. The χ^2 values for fits using different NNPDFs in the extraction of $\sin^2 \theta_{eff}^{lept}(M_Z)$ and $\sin^2 \theta_W$ from $A_{FB}(M)$ measurements can be used to place additional constraints on PDFs. In turn, using these constrained PDFs significantly reduces the PDF errors in the extraction of electroweak parameters.

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