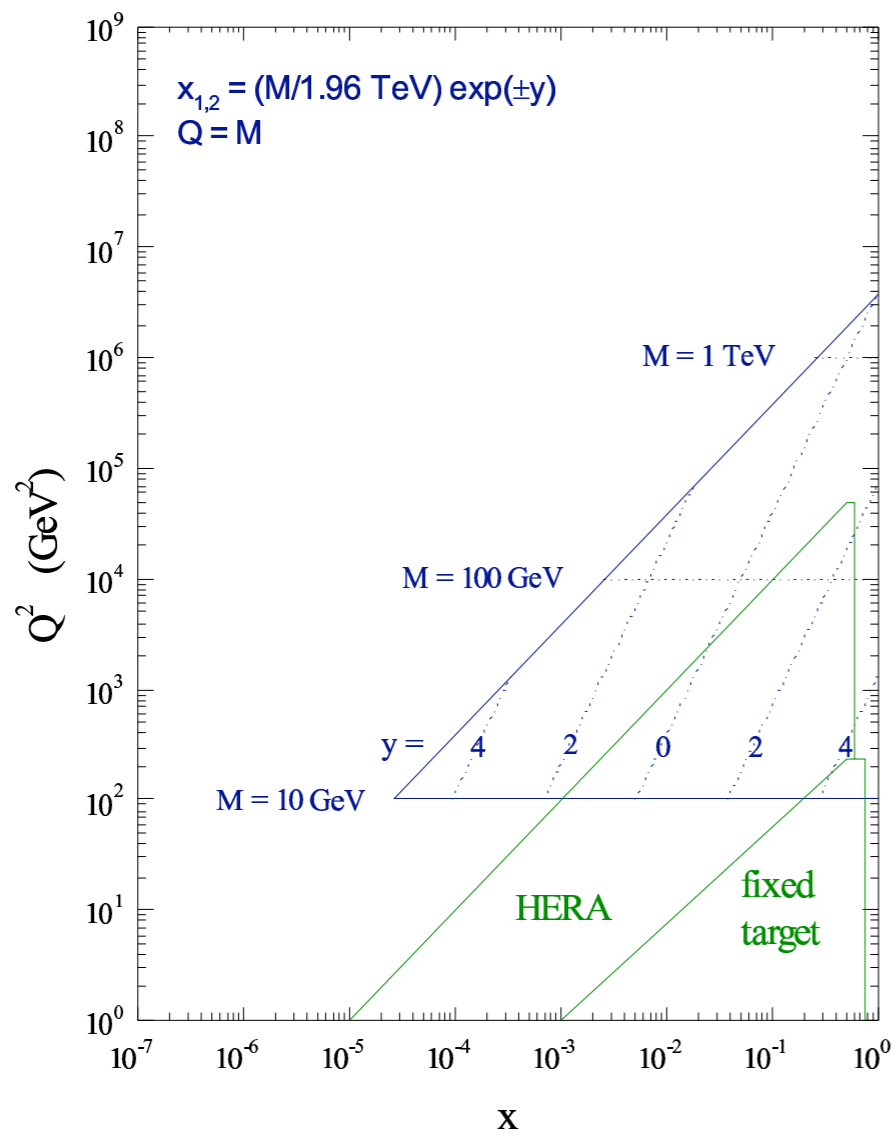


Collider Physics

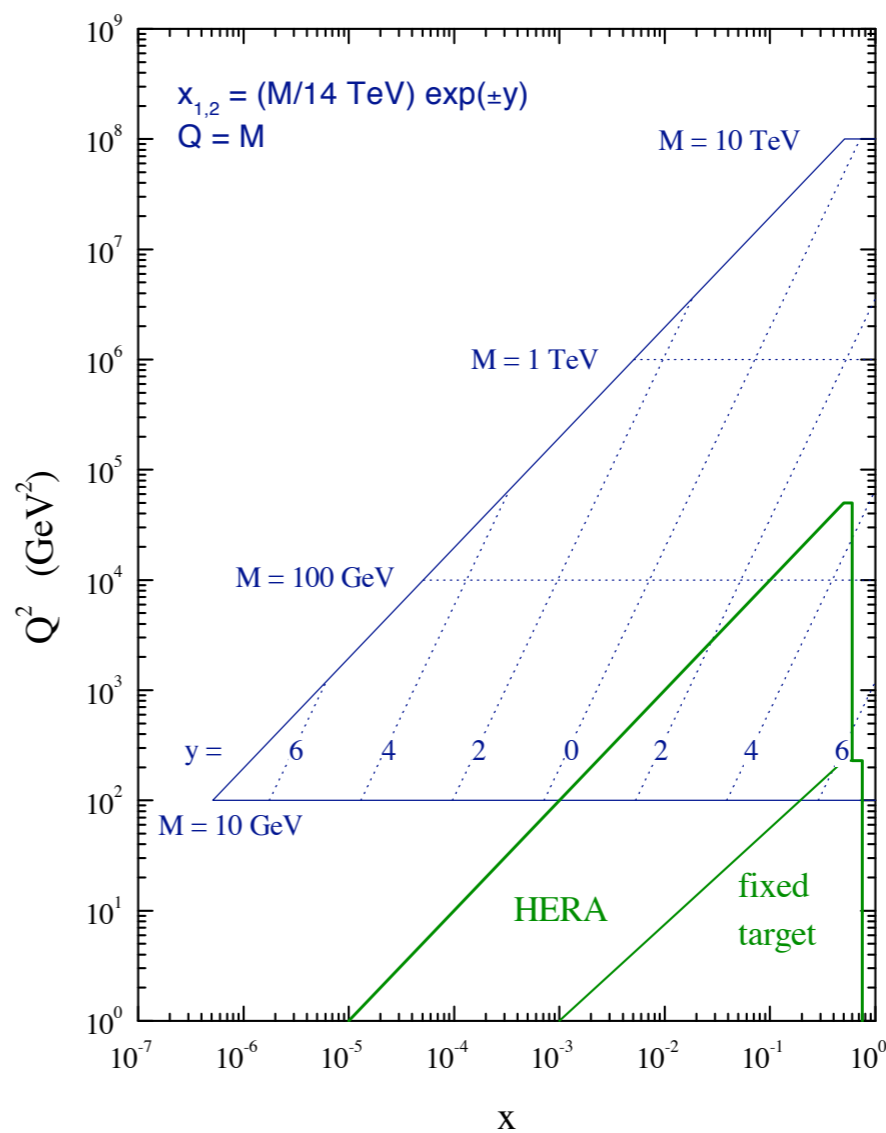
Lecture 2

Maxim Perelstein, Cornell University
MITP Summer School, August 3, 2016

Tevatron parton kinematics



LHC parton kinematics



e — b — a — c — a — c

need data!

Z Rapidity Distributions (Tevatron)

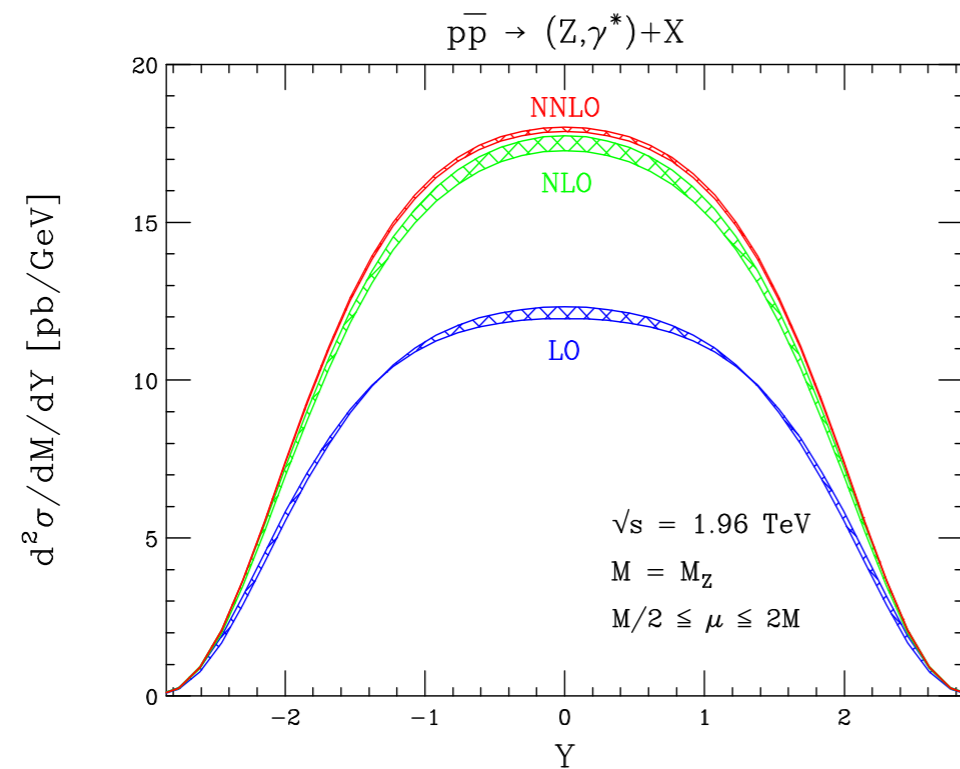


Figure 5: The CMS rapidity distribution of an on-shell Z boson at Run II of the Tevatron. The LO, NLO, and NNLO results have been included. The bands indicate the variation of the renormalization and factorization scales in the range $M_Z/2 \leq \mu \leq 2M_Z$.

Theory: Anastasiou, Dixon, Melnikov,
Petriello, hep-ph/0312266

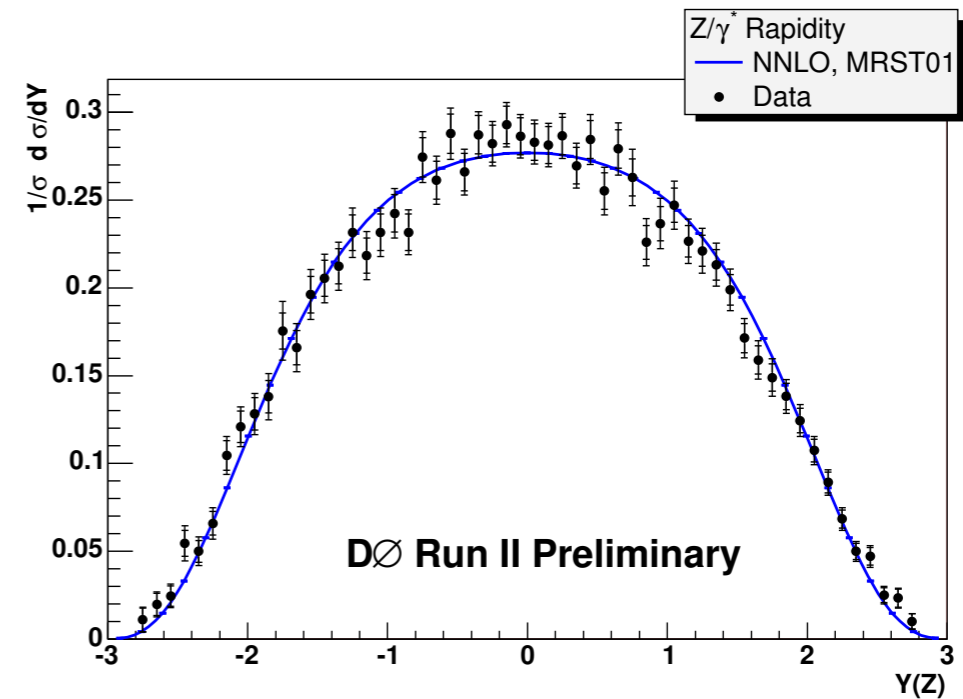
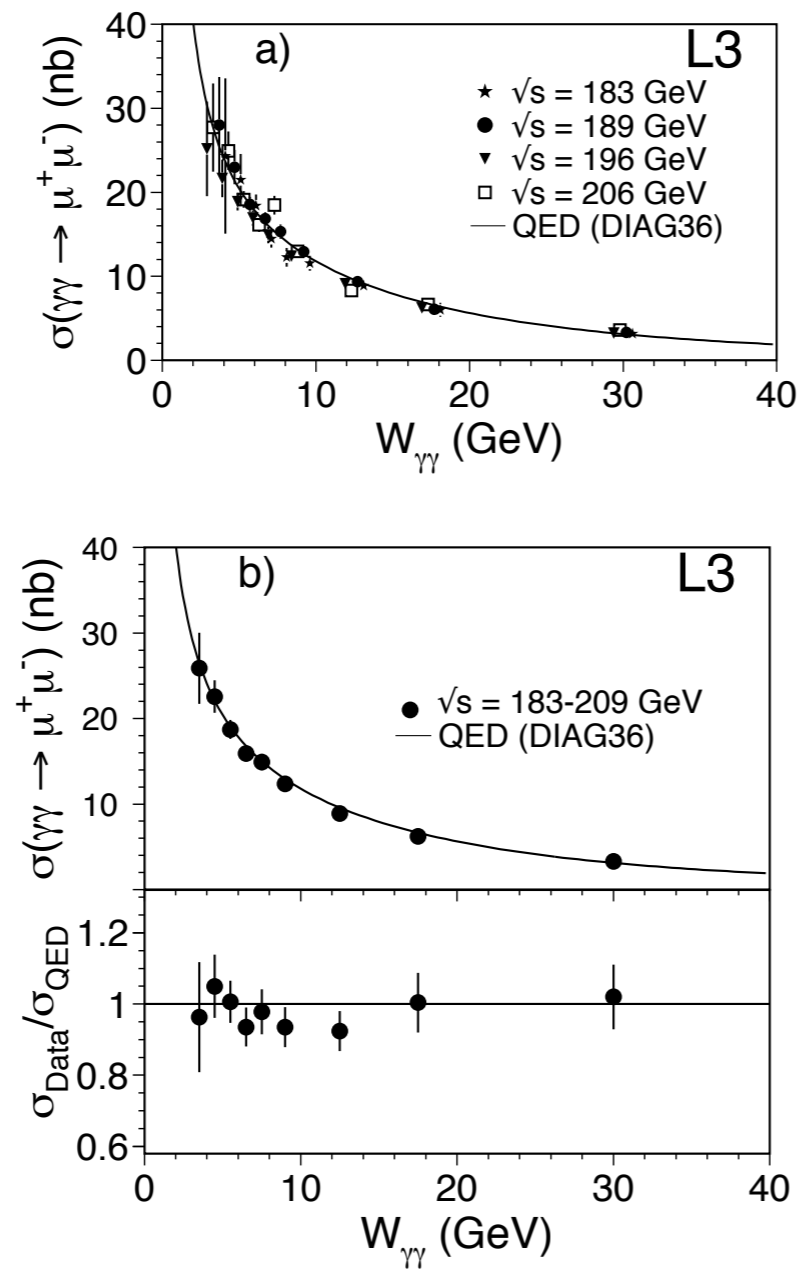


FIG. 5: Analysis result. The outer error bars show the total error, combining statistical and systematic errors, while the inner error bars indicate the statistical error alone. The solid line shows the NNLO prediction based on the MRST 2001 PDFs.

Exp.: D0 Collaboration, 2005



L3, hep-ex/0402037

Photon-photon collisions at LEP-2

Figure 5: The cross section of the process $\gamma\gamma \rightarrow \mu^+\mu^-$ as a function of the $\gamma\gamma$ centre-of-mass energy for a) different values of \sqrt{s} and b) their combination. The data are compared to the QED calculations of DIAG36.