PDFs with Saturation effects from CTEQ-TEA

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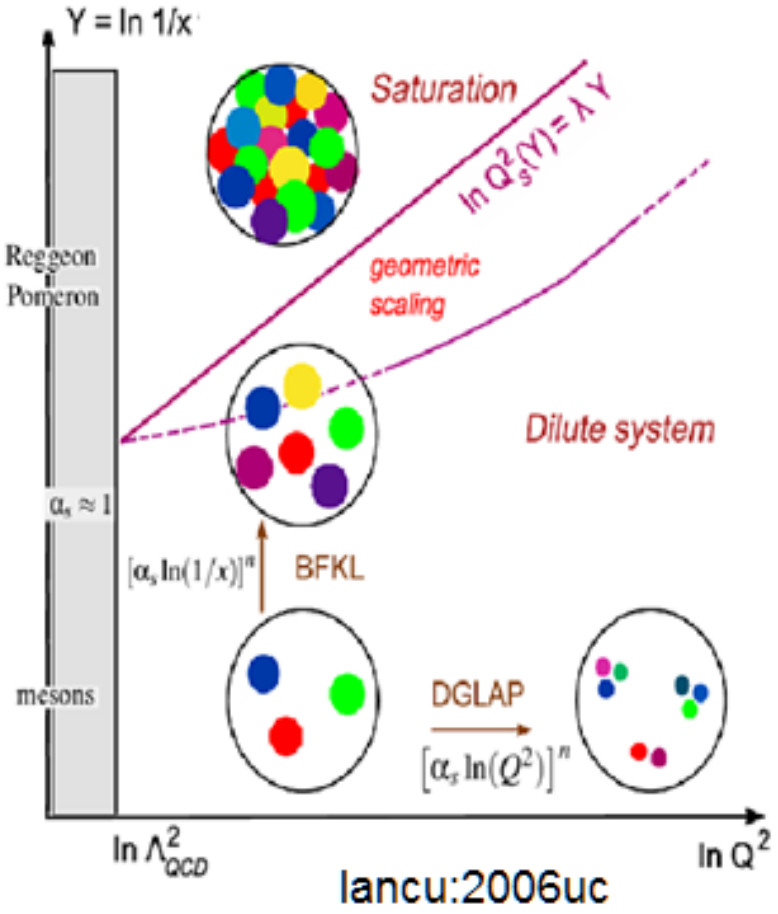
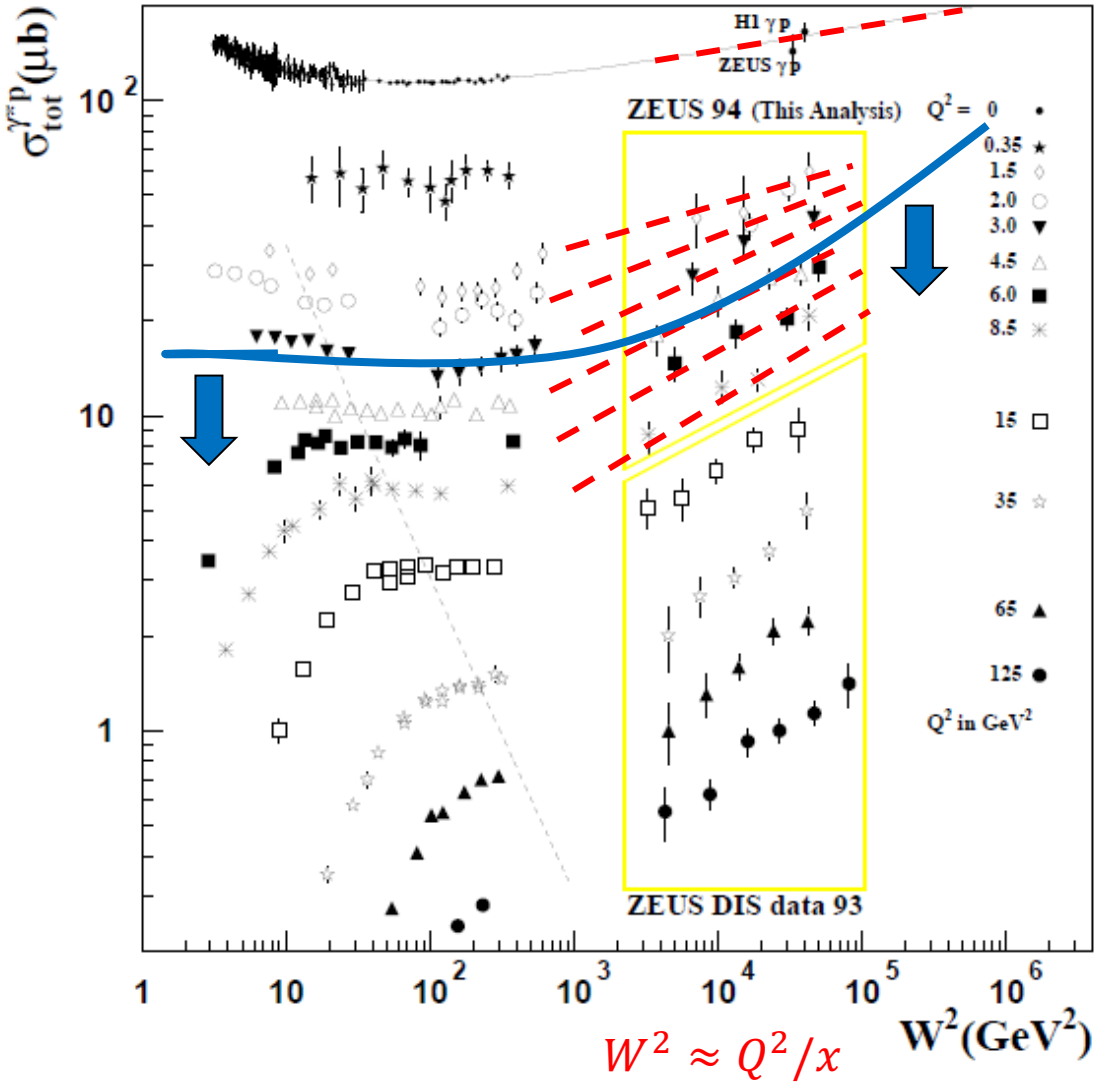
On behalf of the CTEQ-TEA collaboration

QCD dynamics vs. Q and x

$\gamma^* p$ total cross sections
ZEUS, hep-ex/9510009





Slide from P. Nadolsky @ DIS 2016

K. X., EF06 - LoI preparation

How to treat the DIS low-Q and small-x data?

- NNPDF/xFitter: BFKL to resum the small-x log's
- CT: a saturation scale

$$\mu^2_{\mathrm{DIS},x} = a_1(Q^2 + a_2/x^{a_3})$$

- We obtain the same level of agreement between data and theory.
- Both approaches enhance (reduce) the gluon (singlet) PDF at small x and small Q.
- At higher Q, the small-x effect disappears.
- Within the accessible experimental region, the PDFs and predicted cross sections agree well between two approaches.

See the below talk for more details.
https://indico.fnal.gov/event/44075/

Extend the comparisons between two approaches to new kinematic regions.

- At smallest x (10^{-6}) and small Q (2 GeV), the saturation dynamics becomes markedly different from the large-log approximation based on the BFKL formalism.
- Delineate the boundaries among the DGLAP, BFKL and saturation approaches.
- Understand the implications to phenomenological predictions at the FCC-hh collider and cosmic ray experiments.