

HERA "discovered"

the rise of $F_2(x, Q^2)$ vs x in the deep inelastic region - large sea quark densities ^{Low X}

the strong Q^2 dependence of $F_2(x, Q^2)$ - large gluon density ... precision ds

"no respectable theoretical understanding."
(P.V.L.)

large diffractive scattering contributions

P ?

heavy flavour production (c) as a test of QCD NLO

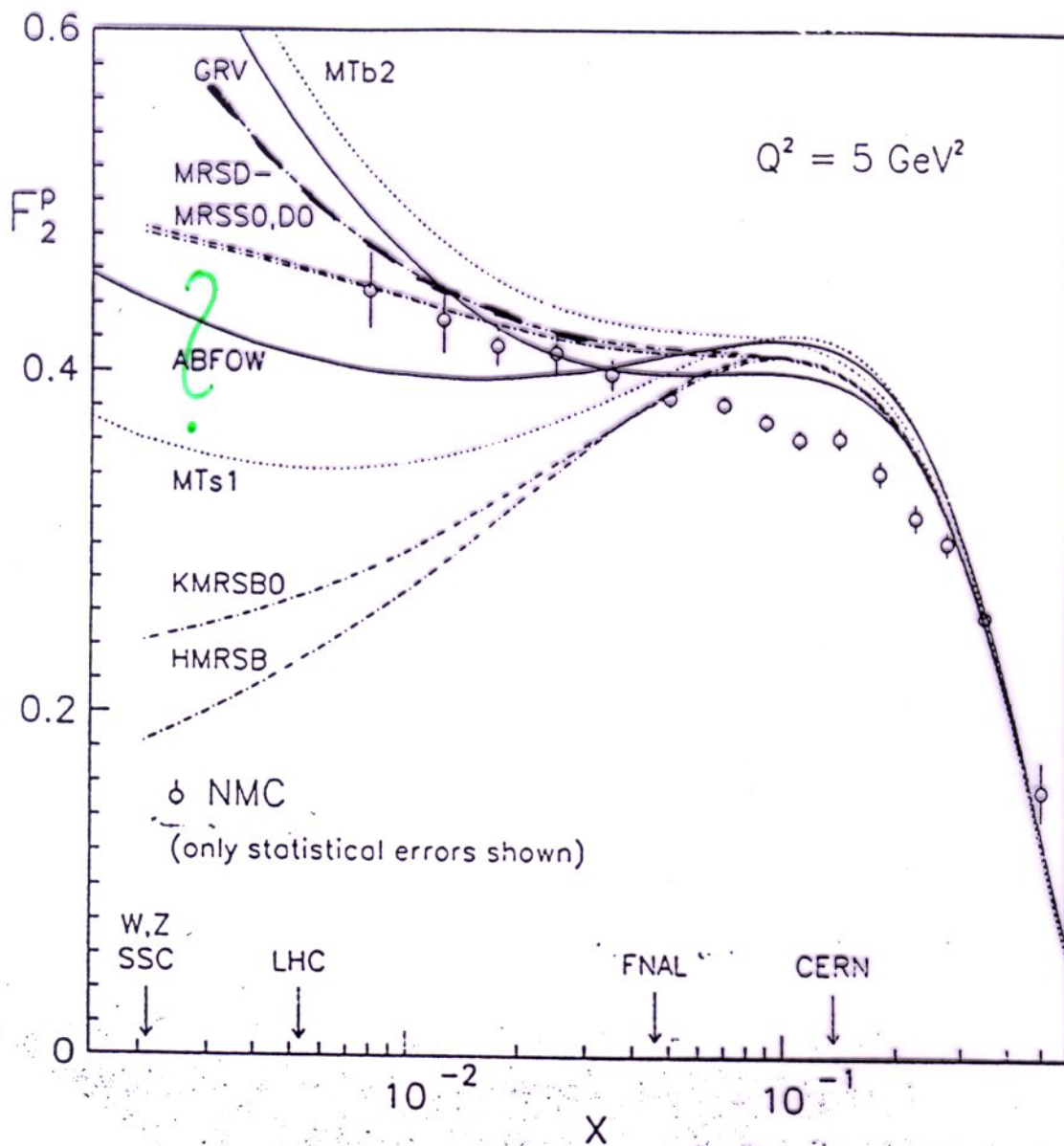
b ?

no departure from point-like partons and leptons down to $\sim 10^{-18}$ m.

no LQ

- big success of accelerator physics and technology & large scale investment of human and other resources. -

Parton Density Functions of the Nucleon



status before HERA

HERA proposal : Juli 1981

" This machine is planned to come into operation around 1990 "

$E_e = 12 \text{ GeV}$ $E_p = 480 \text{ GeV}$ $L = 1.03 \cdot 10^{26} \text{ cm}^{-2} \text{ s}^{-1}$
 $ep \rightarrow ep \gamma$

Spätschicht 19.10.

Protonenstrahl $\sim 72 \mu\text{A} \approx 10^{10}$

Elektronenstrahl $\sim 2 \cdot 10^9$

Elektronen und Protonen ~~vertikal~~ ^{transversal} mit den $\pm 7 \text{ mm}$ Positionsmitteln auf die richtigen

Lage gebracht. Timing abgeglichen so

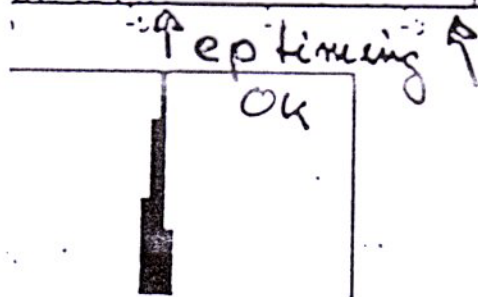
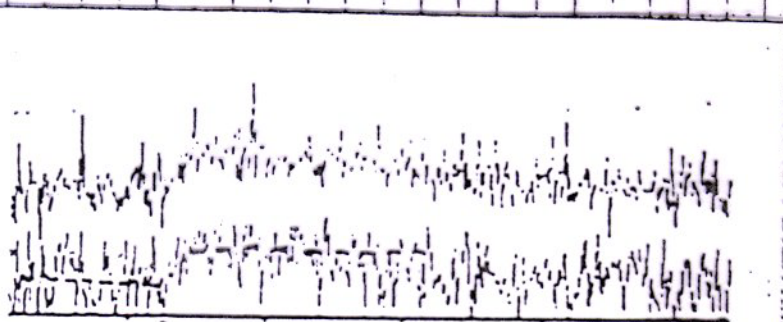
das die beiden Bunde sich im

WWD-Nord treffen. \Rightarrow Zunahme der

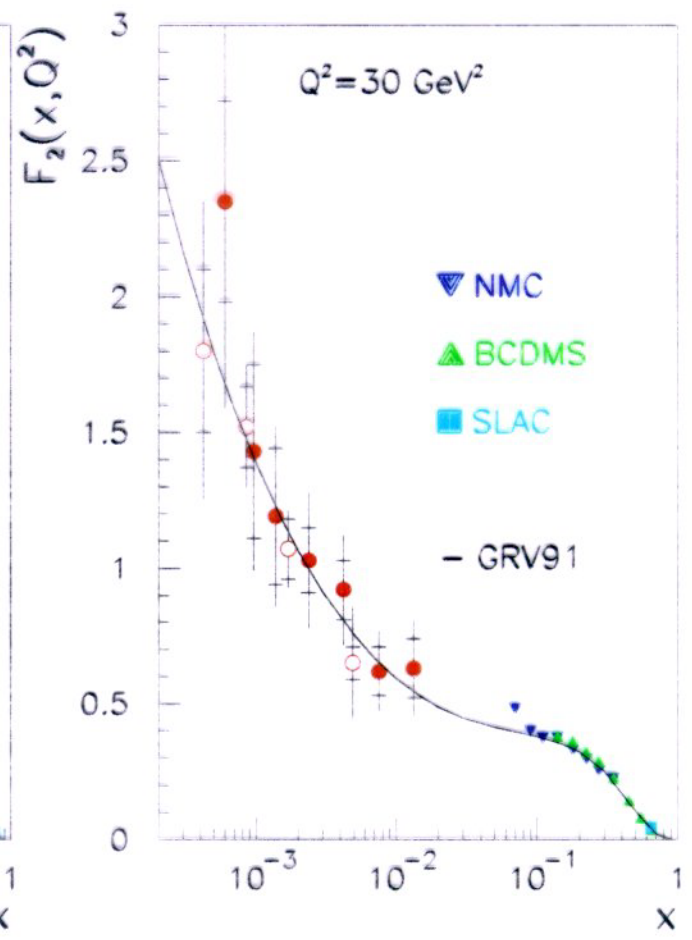
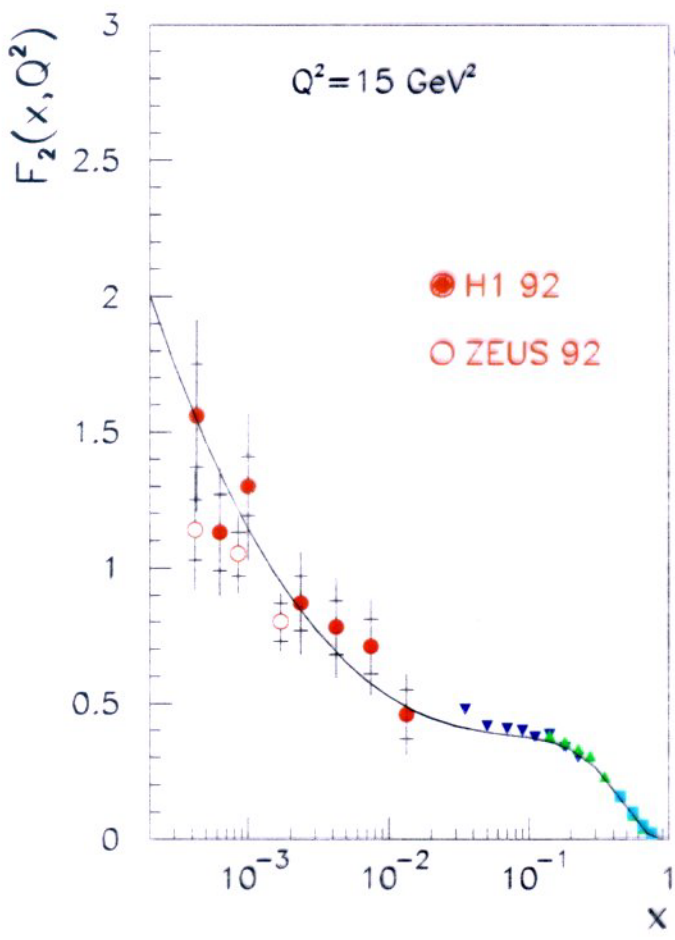
$e \gamma$ Konfiguration Rate um ein Faktor 2!

\Rightarrow erste $e-p$ Kollisionen in HERA

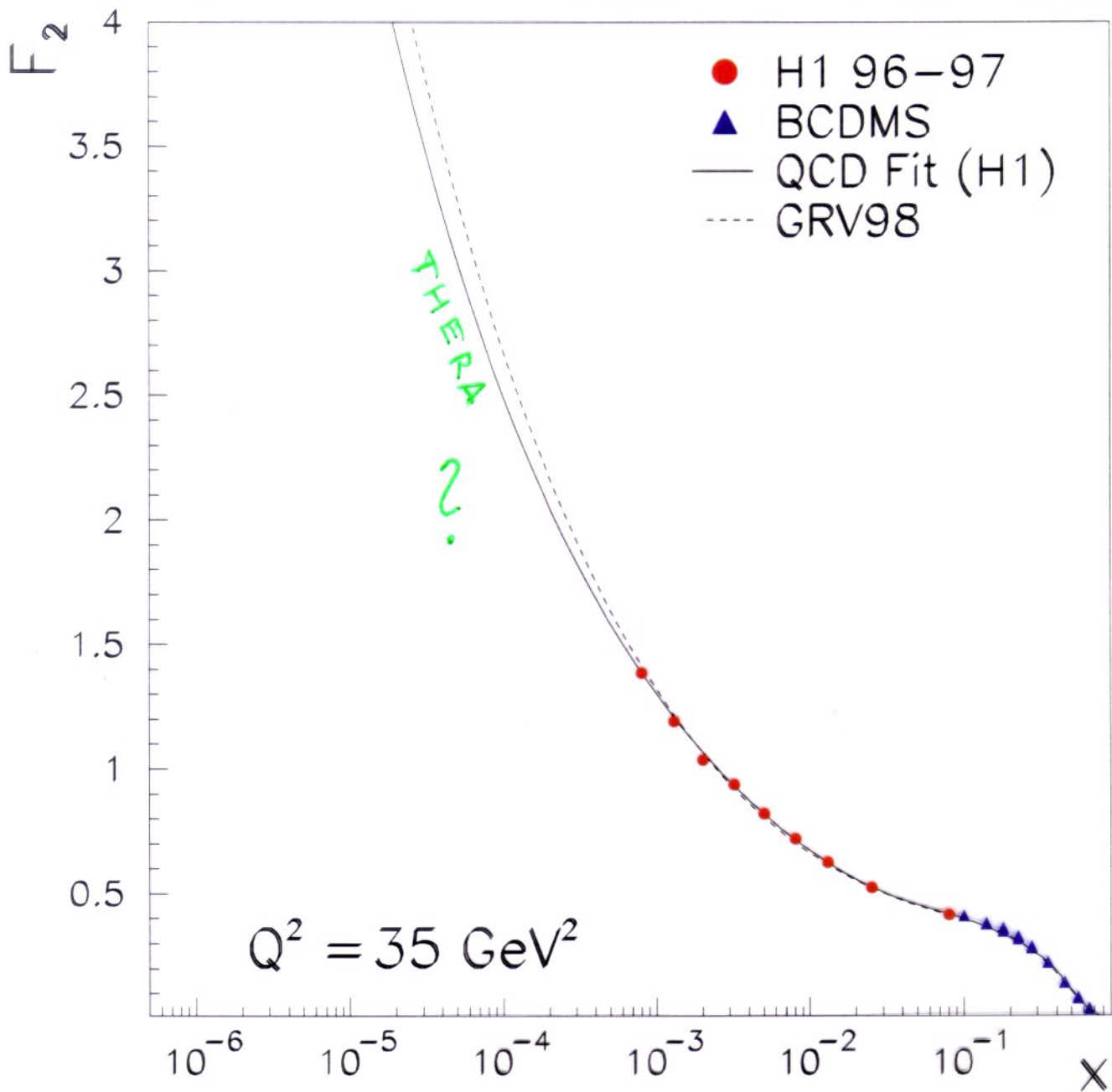
19.10.91 um 18⁵⁰



mit trans. Bunde gebracht
(0.5 mm - vertikal gebracht)



$\sigma_{H1} = 22 \text{ nb}^{-1}$
 DESY 93-117.



- 2 problems in HEP : shortage of money
overconfidence of theorists

L. Lederman.
Madison 1980.