Tief-inelastische Elektron-Proton Streuung

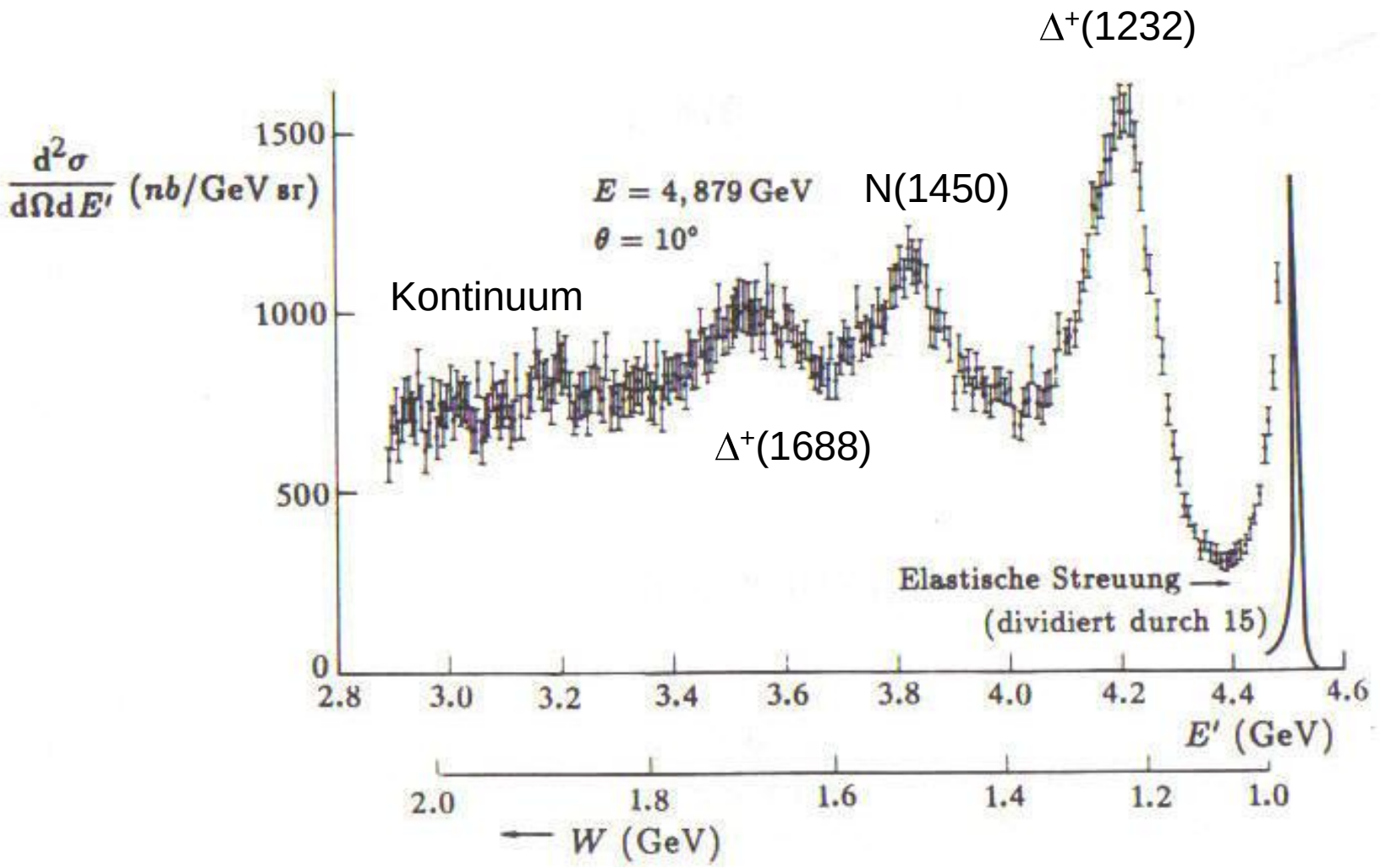

Fig-TP-4.10

Erste Messung der Strukturfunktion W_2

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OBSERVED BEHAVIOR OF HIGHLY INELASTIC ELECTRON-PROTON SCATTERING

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SLAC & MIT
Experiment 1969

Spectrometer at given θ

$\frac{\Delta p}{p} \sim 0.1\%$ $\Delta\theta \sim 0.7$mrad

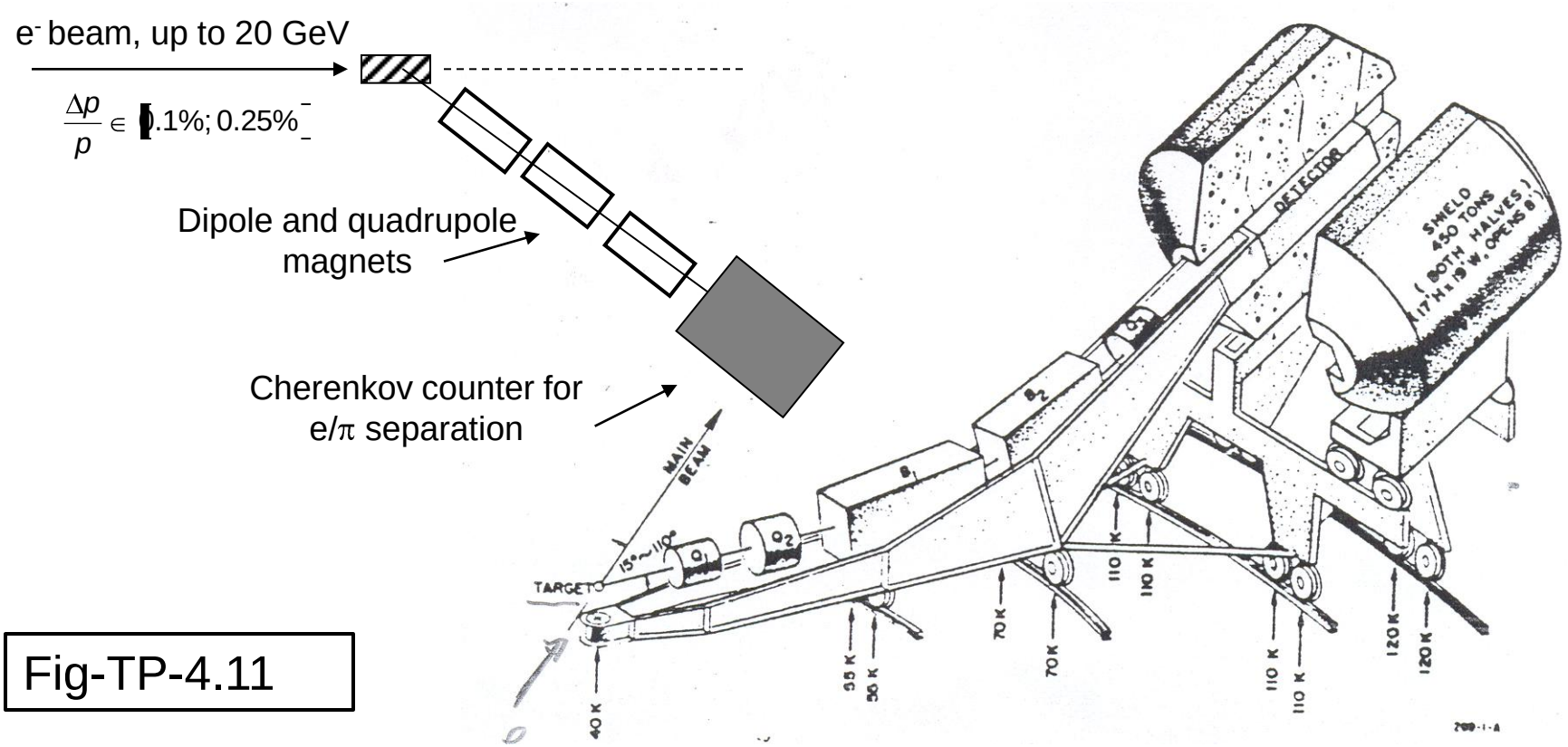
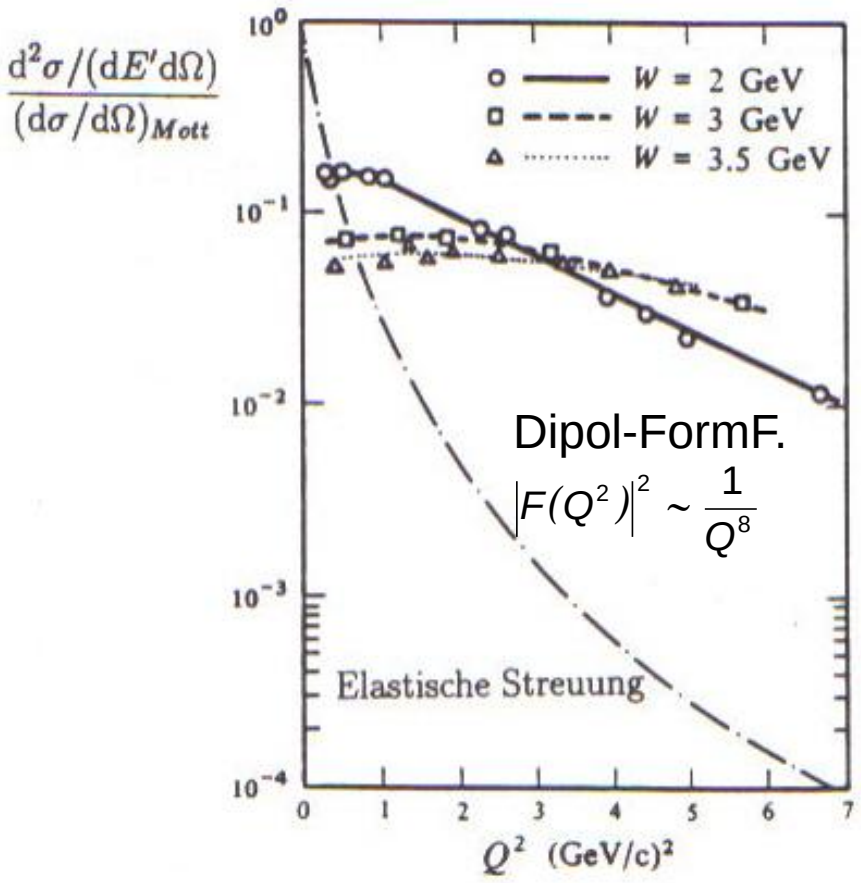
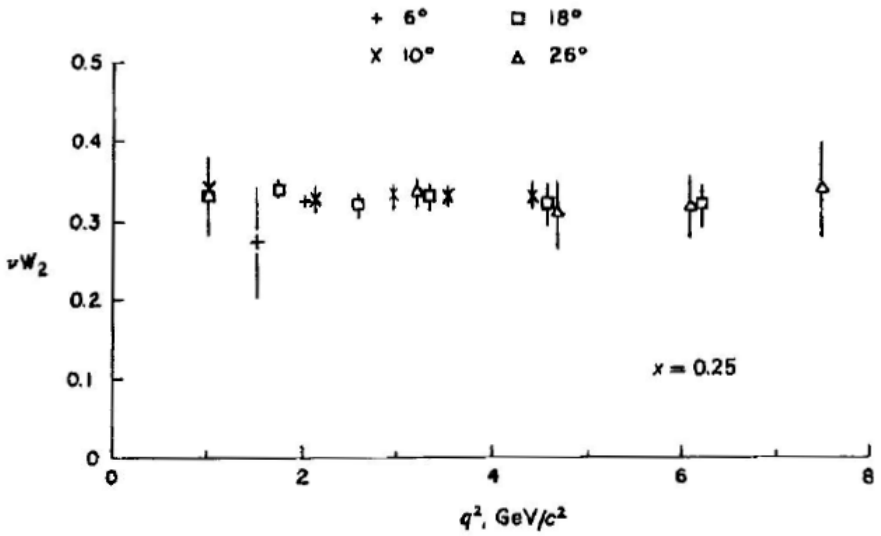


Fig-TP-4.11

Fig-TP-4.12





Structure function νW_2 does not depend explicitly on Q^2 but depends only on the dimensionless variable x_{Bj}:

Bjorkensche Skalenvariable $x_{Bj} = \frac{Q^2}{2M\nu}$

→ **Q^2 Scale invariance: "scaling"**

Fig-TP-4.13

Callan-Gross Relation: Spin-1/2 Partonen

$$\frac{2xF_1}{F_2}$$

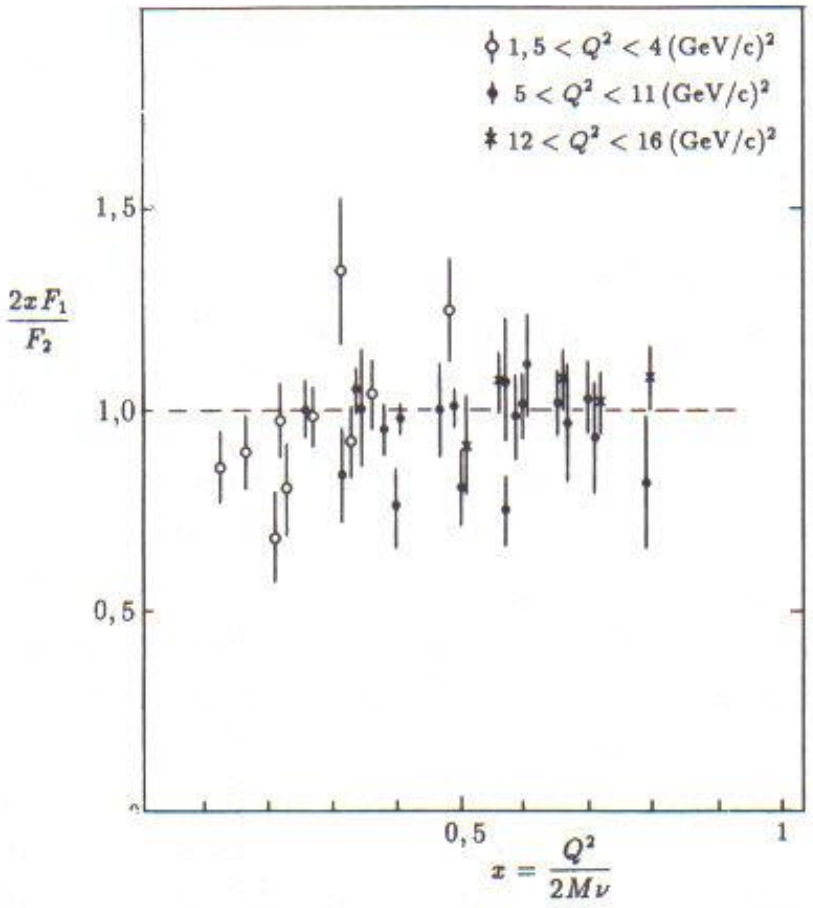
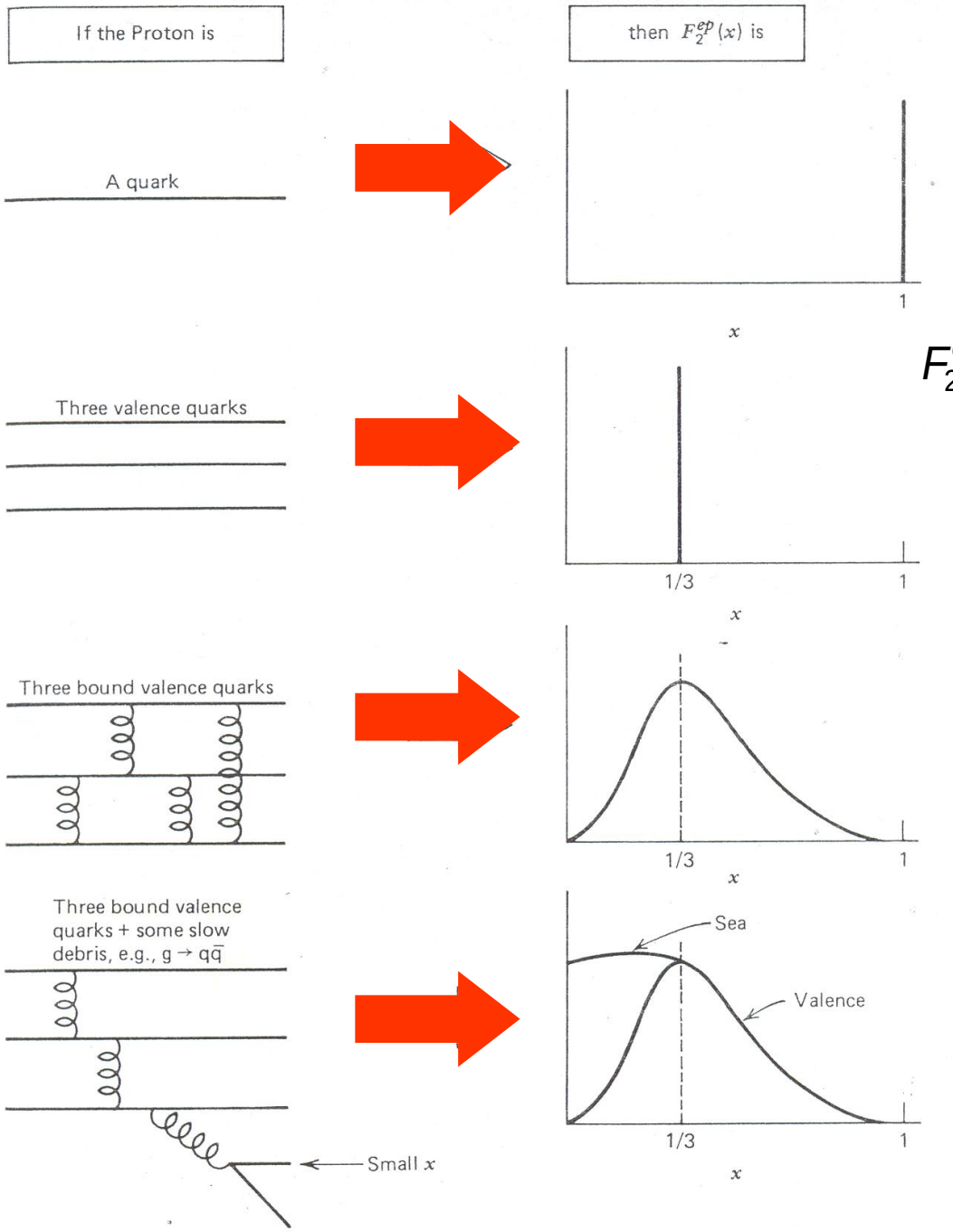


Fig-TP-4.14

Proton Modell



$$F_2^{ep}(x)$$

$$F_2^{ep}(x) = x \cdot \sum_i z_i^2 f_i(x)$$

Fig-TP-4.15

Parton-Dichten im Proton

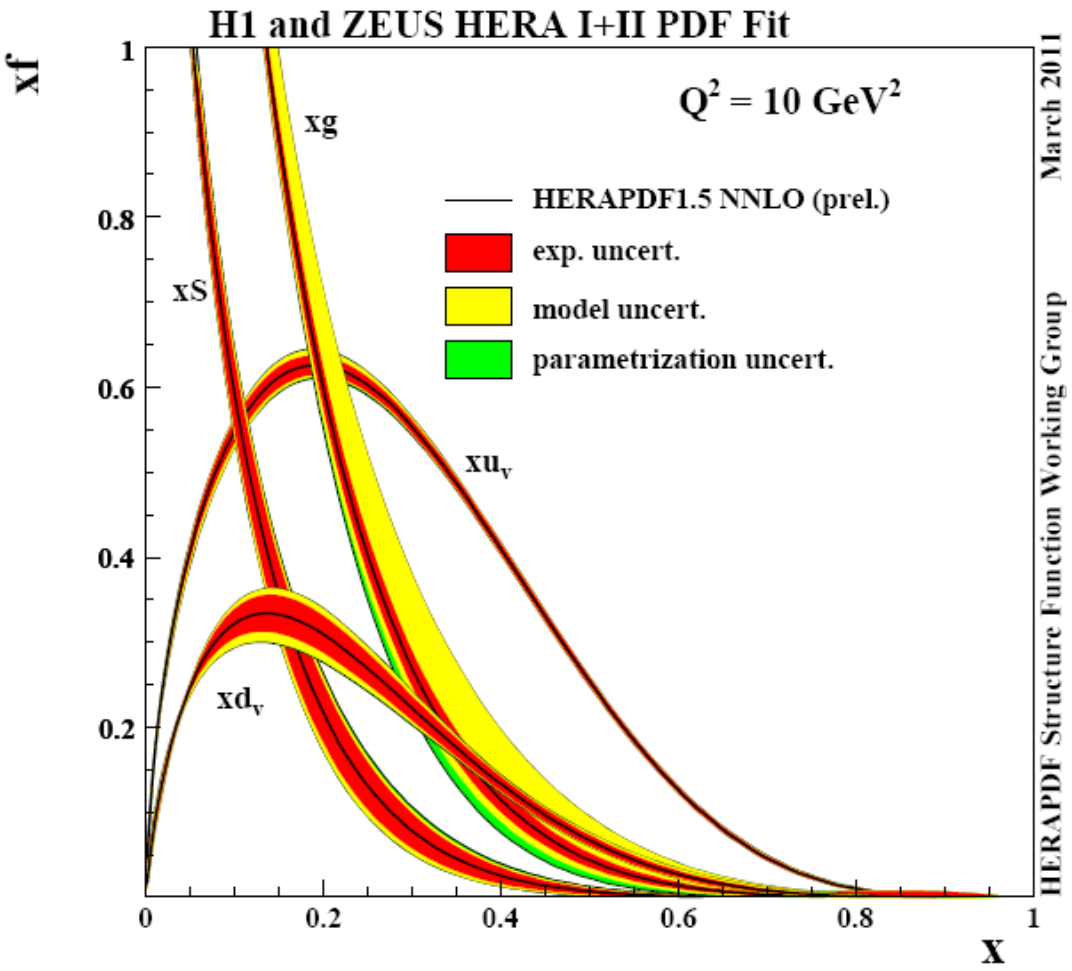


Fig-TP-4.16