



Jet energy calibration with Z+jet

Figures from:

1) D. Haitz, Diploma thesis,
IEKP-KA-2013-12,
CERN-THESIS-2013-096

2) G. Sieber, Diploma thesis,
IEKP-KA-2013-10,
CERN-THESIS-2013-034

3) CMS, Physics Analysis
Summary,
CMS-PAS-SMP-12-027

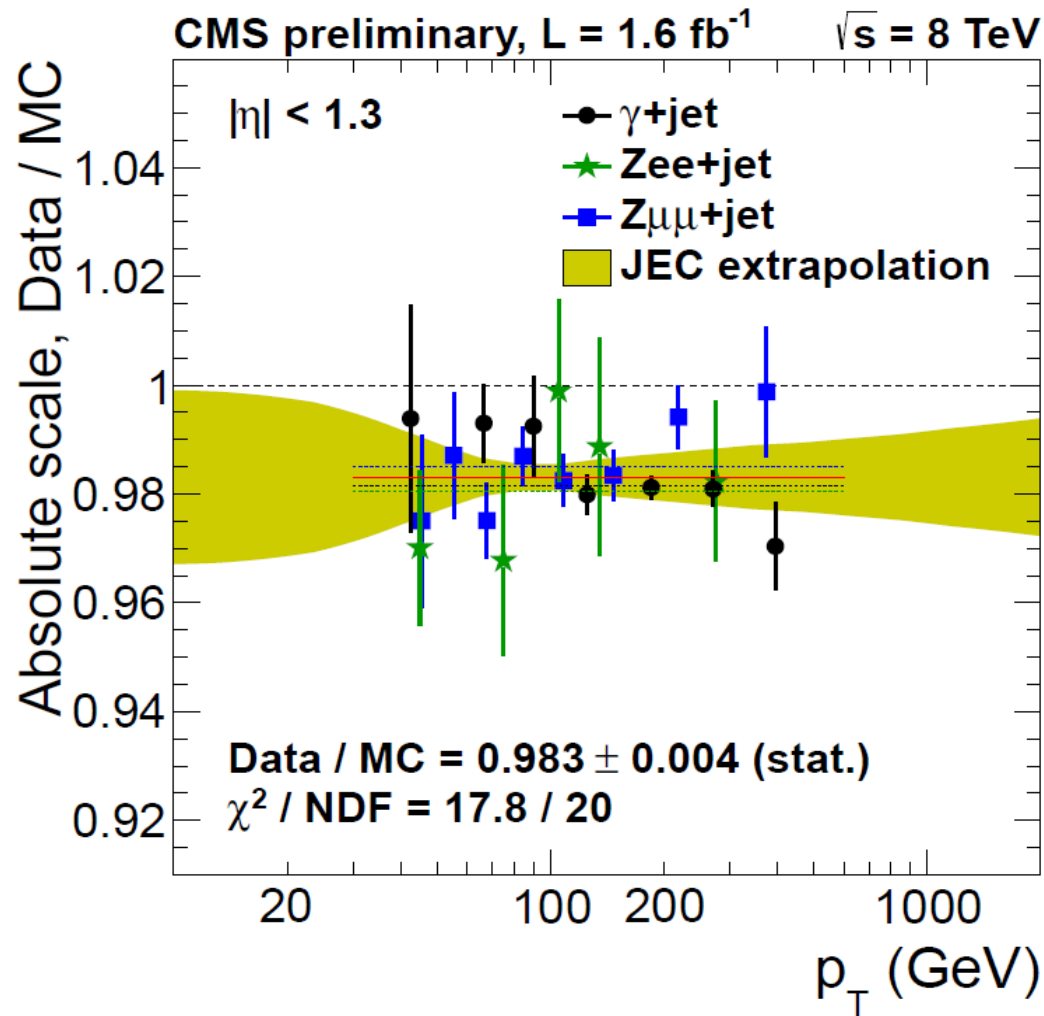


Figure 6.26: Combination of the MPF response ratio between data and simulated events for the different decay channels $Z \rightarrow \mu^+\mu^- + \text{jet}$, $Z \rightarrow e^+e^- + \text{jet}$ and $\gamma + \text{jet}$ [59].



CMS inclusive jets and gluon PDF

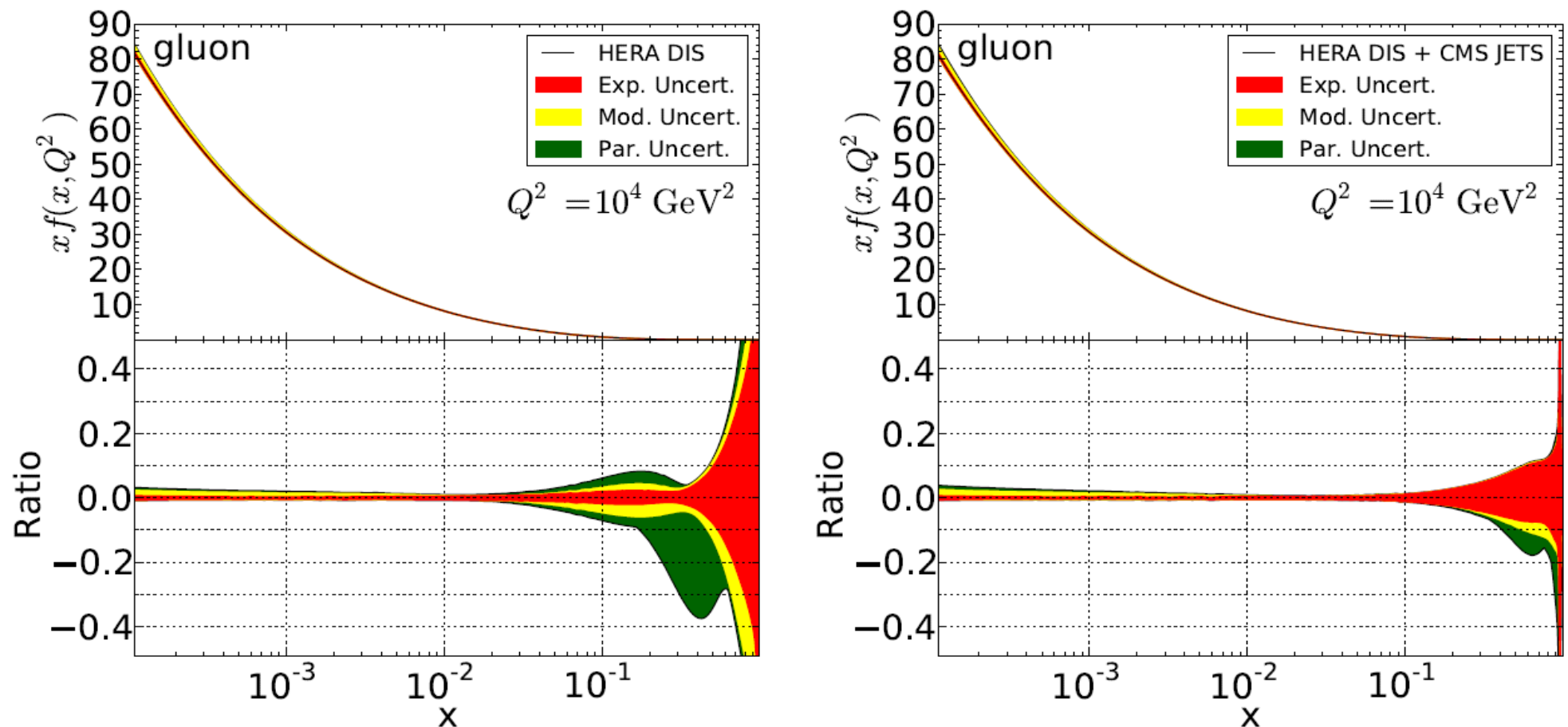


Figure 5.11.: Fit of the gluon PDF with HERA DIS data (left) and additionally inclusive jet data 2011 from CMS (right). The gluon PDF is probed directly by inclusive jet data. Due to constraints of the inclusive jet cross sections 2011, this causes a strong reduction of the model and parametrisation uncertainties as well as of the experimental uncertainty in the x -region above 0.5. The PDF is evolved to $Q^2 = 10^4 \text{ GeV}^2$.

Determination of the strong coupling

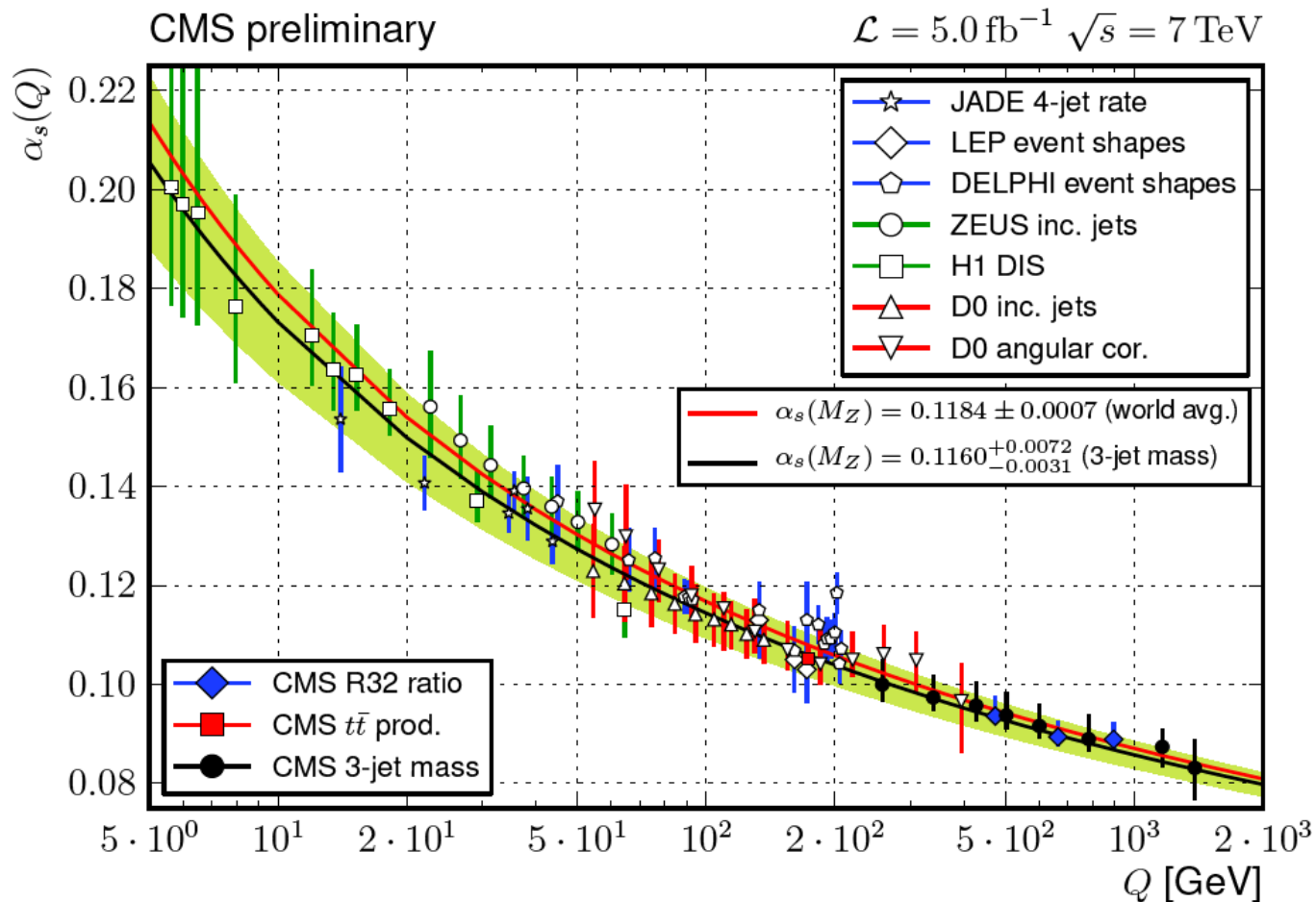


Figure 6: Comparison of the $\alpha_s(Q)$ evolution as determined in this analysis from all measurement bins at central rapidity (curve with uncertainty band) to the world average (upper curve). The error bars on the data points correspond to the total uncertainty. In addition an overview of measurements of the running of the strong coupling constant $\alpha_s(Q)$ from electron-positron collider experiments [38–40], electron-proton experiments [43–45], and proton/anti-proton collider experiments [34, 35, 41, 42] is presented. The results of this analysis extend the covered range to high scales Q up to $\approx 1.4 \text{ TeV}$.