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Diffractive dijet photoproduction at ZEUS

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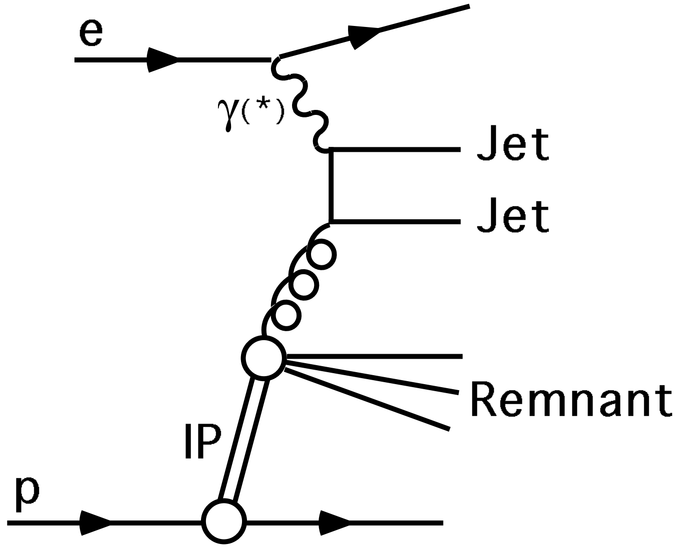
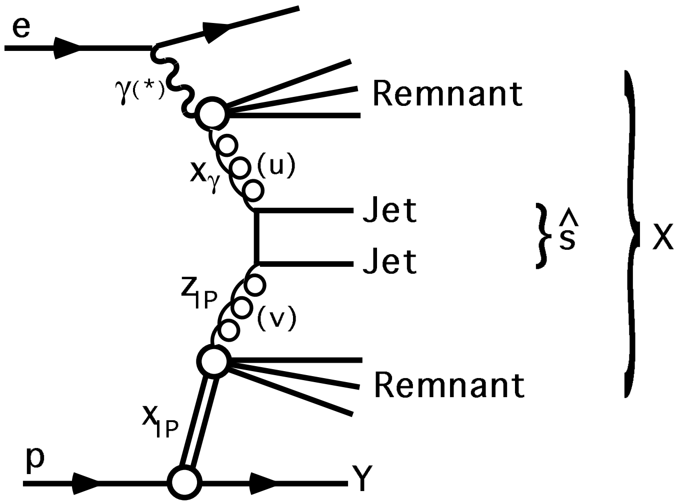
Factorization tests in γp

Real photon ($Q^2 \simeq 0$) can develop hadronic structure
$\Rightarrow$ study fact. breaking at HERA

direct γ ($x_\gamma \simeq 1$)

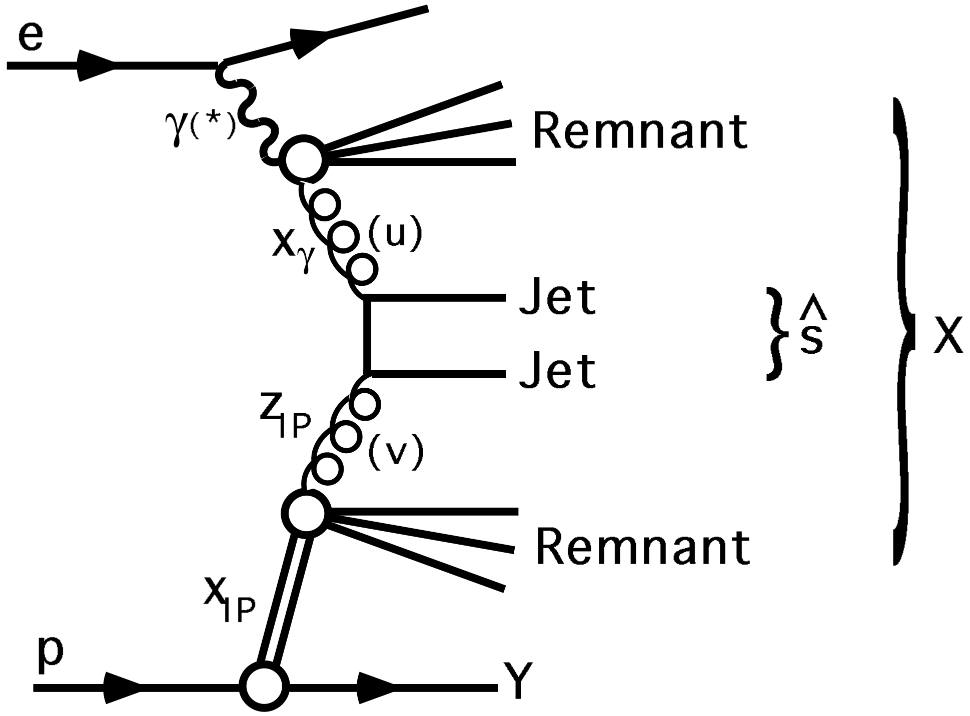


resolved γ (hadron like, at low x_γ)



in NLO, suppression of resolved contribution by a factor 3 expected
(Klasen & Kramer)

Kinematics



Photoproduction: $Q^2 \simeq 0$

y	fraction of longitudinal momentum of e taken by γ
x_γ	fraction of longitudinal momentum of γ in hard scattering
M_X	hadronic mass from γ dissociation
$z_{\mathbb{P}}$	fraction of longitudinal momentum of $\mathbb{P}$ taken by parton
$x_{\mathbb{P}}$	fraction of longitudinal momentum of p in diffr. exchange

Event selection

- Data sample 99-00 data ($E_e = 27.5$ GeV, $E_p = 920$ GeV)
- Integrated luminosity 77.6 pb^{-1}

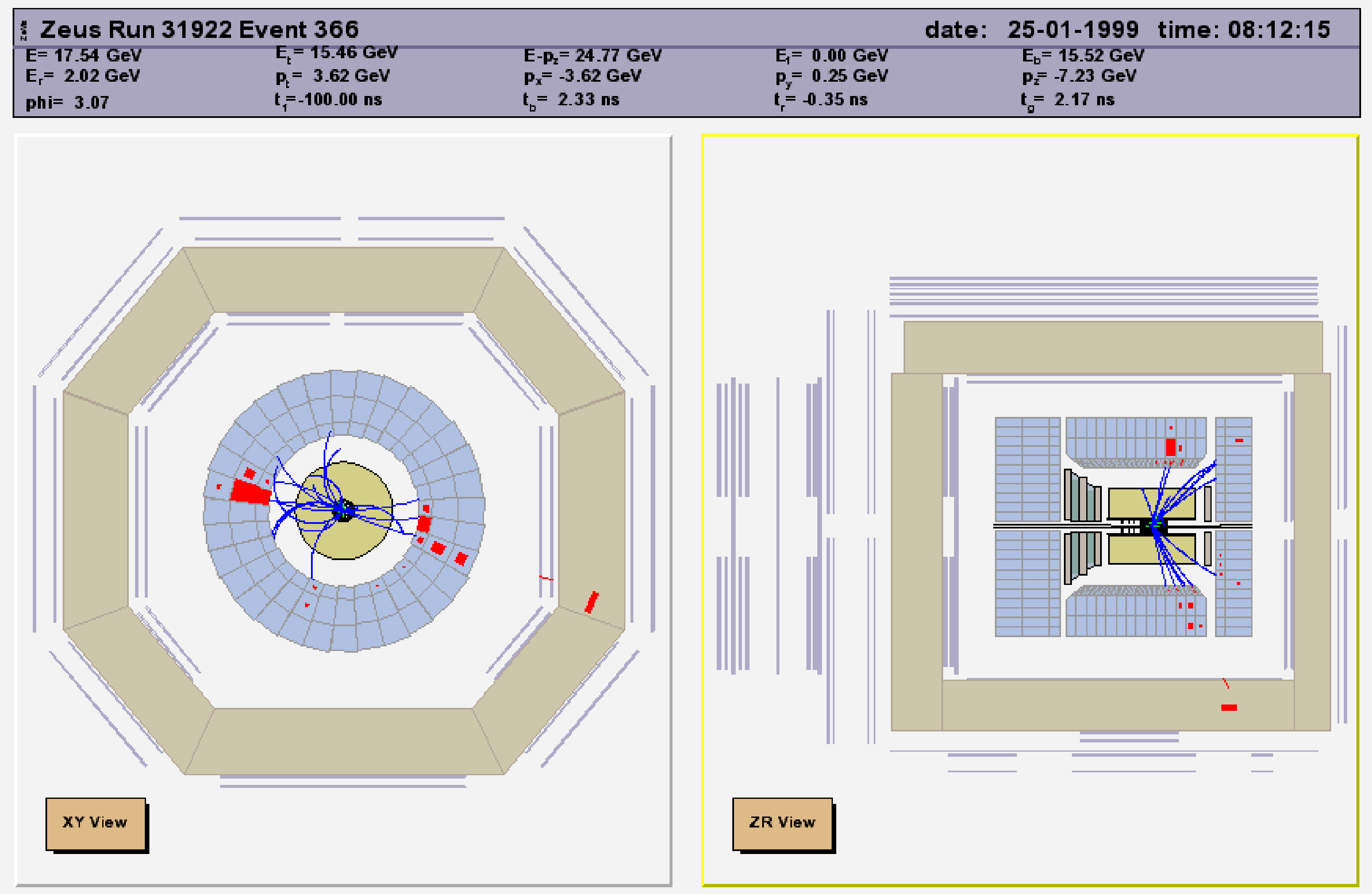
PHP selection	no e in detector $0.20 < y_{JB} < 0.85$
Diffr. selection	rapidity gap of at least 3 units $x_{I\!P} < 0.035$
dijet selection	≥ 2 jets with k_T algorithm in lab frame $E_T^{jet1(2)} > 7.5(6.5)$ GeV, $-1.5 < \eta^{jet1,2} < 2.0$

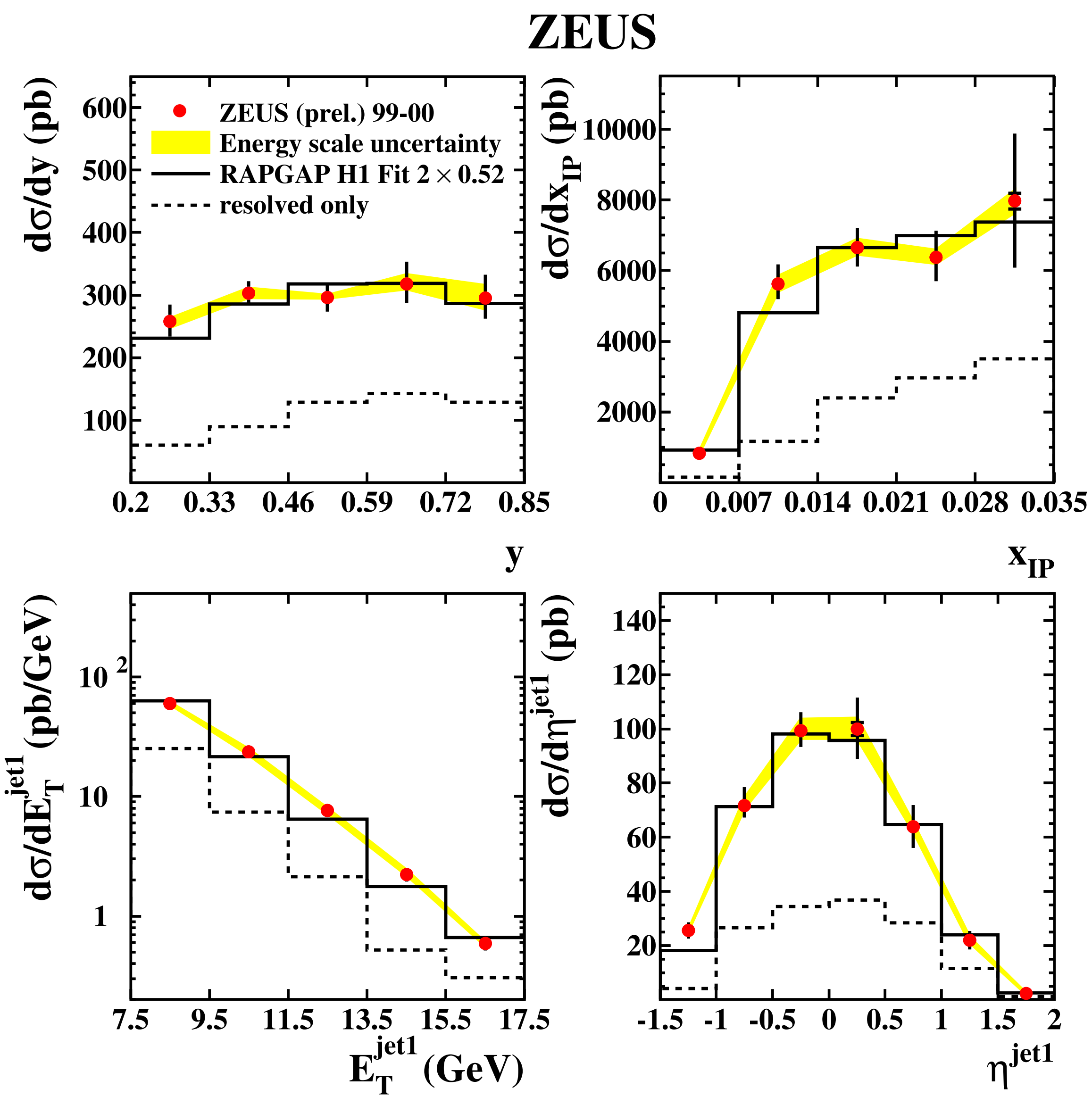
$\Rightarrow$ 10673 events are selected

Background: p-diss events $(16 \pm 4)\%$ subtracted

non-diffractive events 10% non subtracted

Event display: dijet in diffractive γp

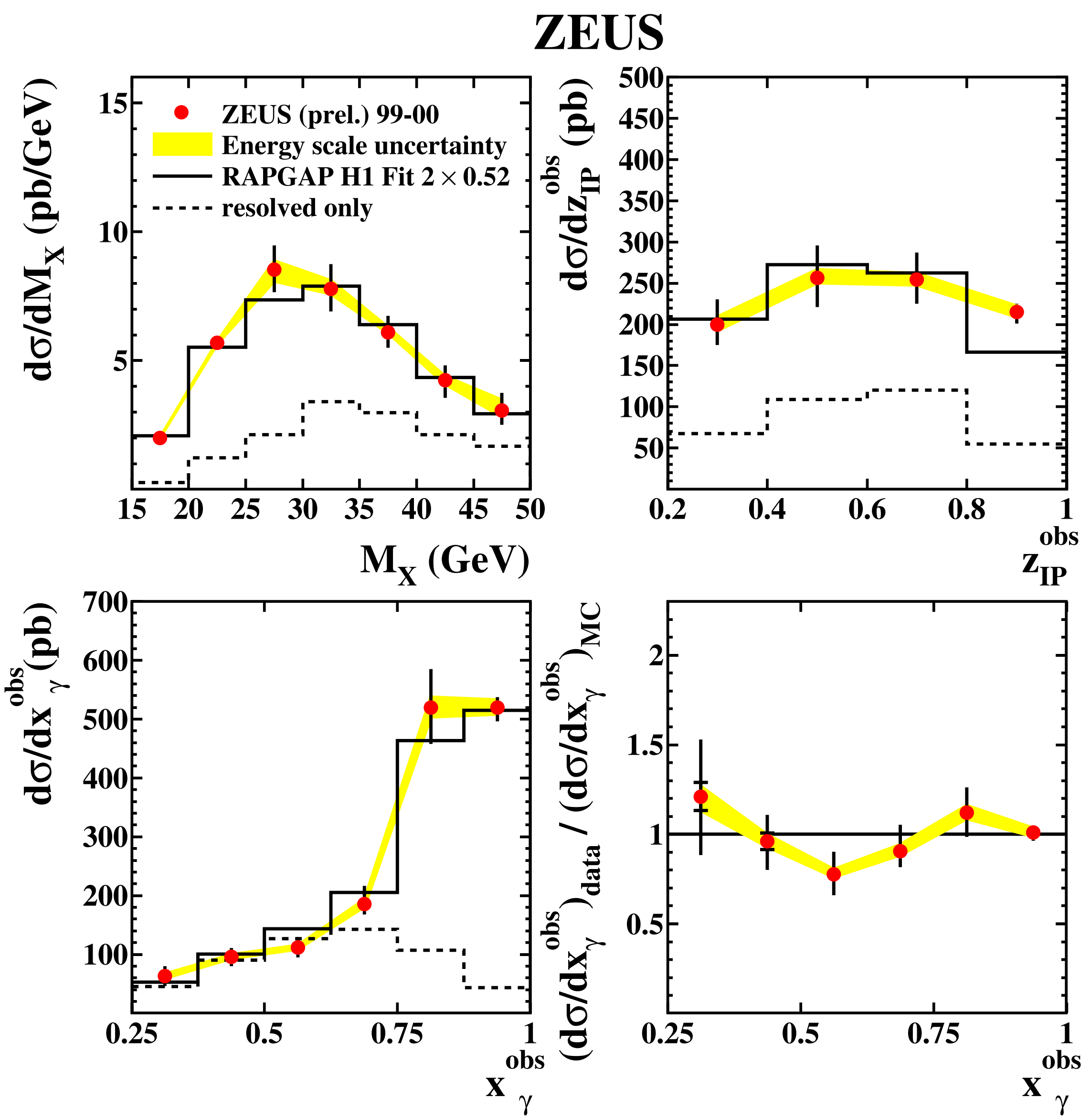




Data vs MC LO

- MC RAPGAP (direct + resolved) describes shape of $y, x_{I\!P}, E_T^{jet}, \eta_T^{jet}$

RAPGAP v3.00
structure functions: p MRSG, γ GRV-G-LO, $I\!P$ H1 fit2



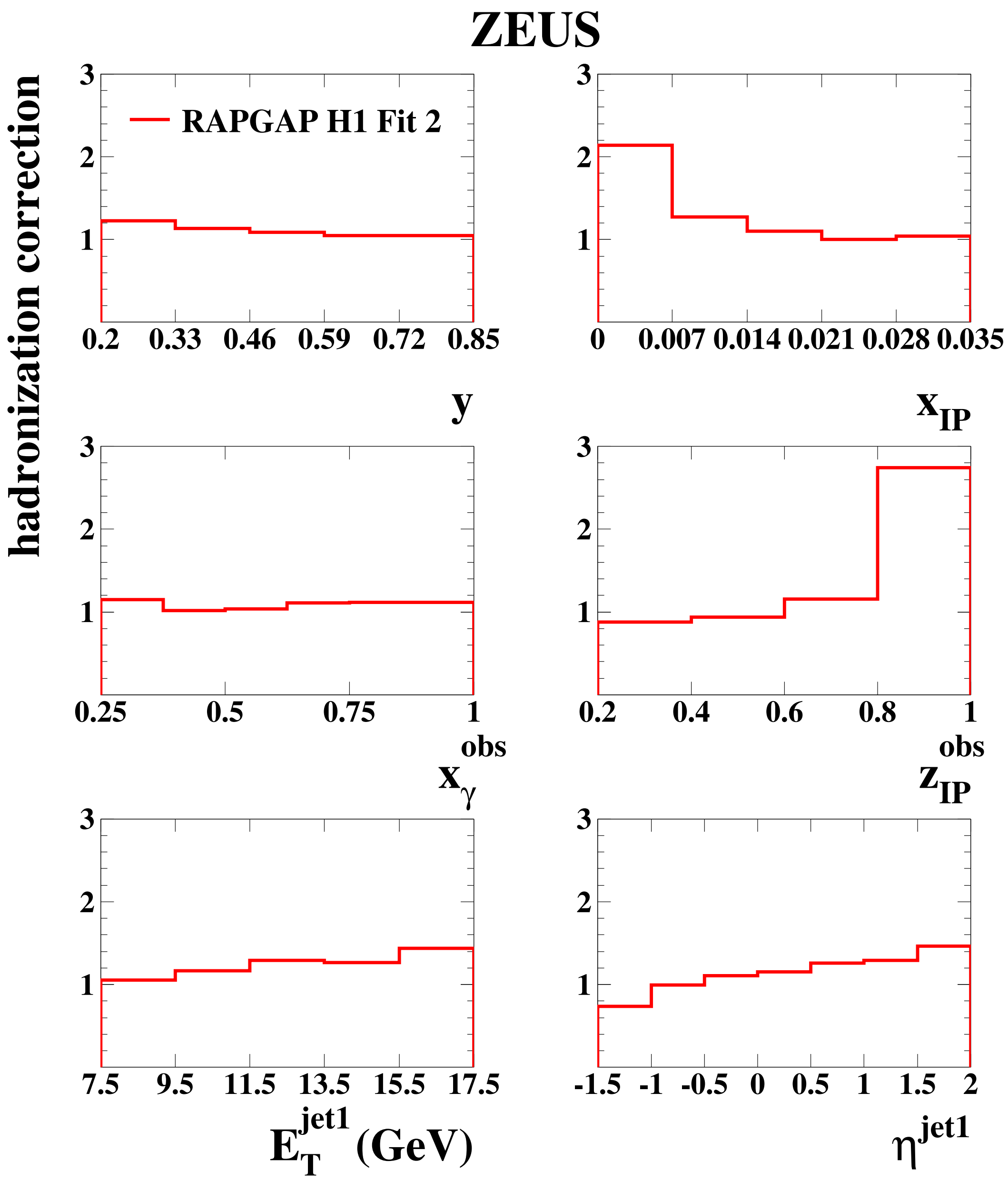
Data vs MC LO

- MC RAPGAP (direct + resolved) describes shape of hadronic mass $M_x, z_{I\!P}, x_\gamma$

- ratio data/MC: no suppression of resolved component as described by RAPGAP

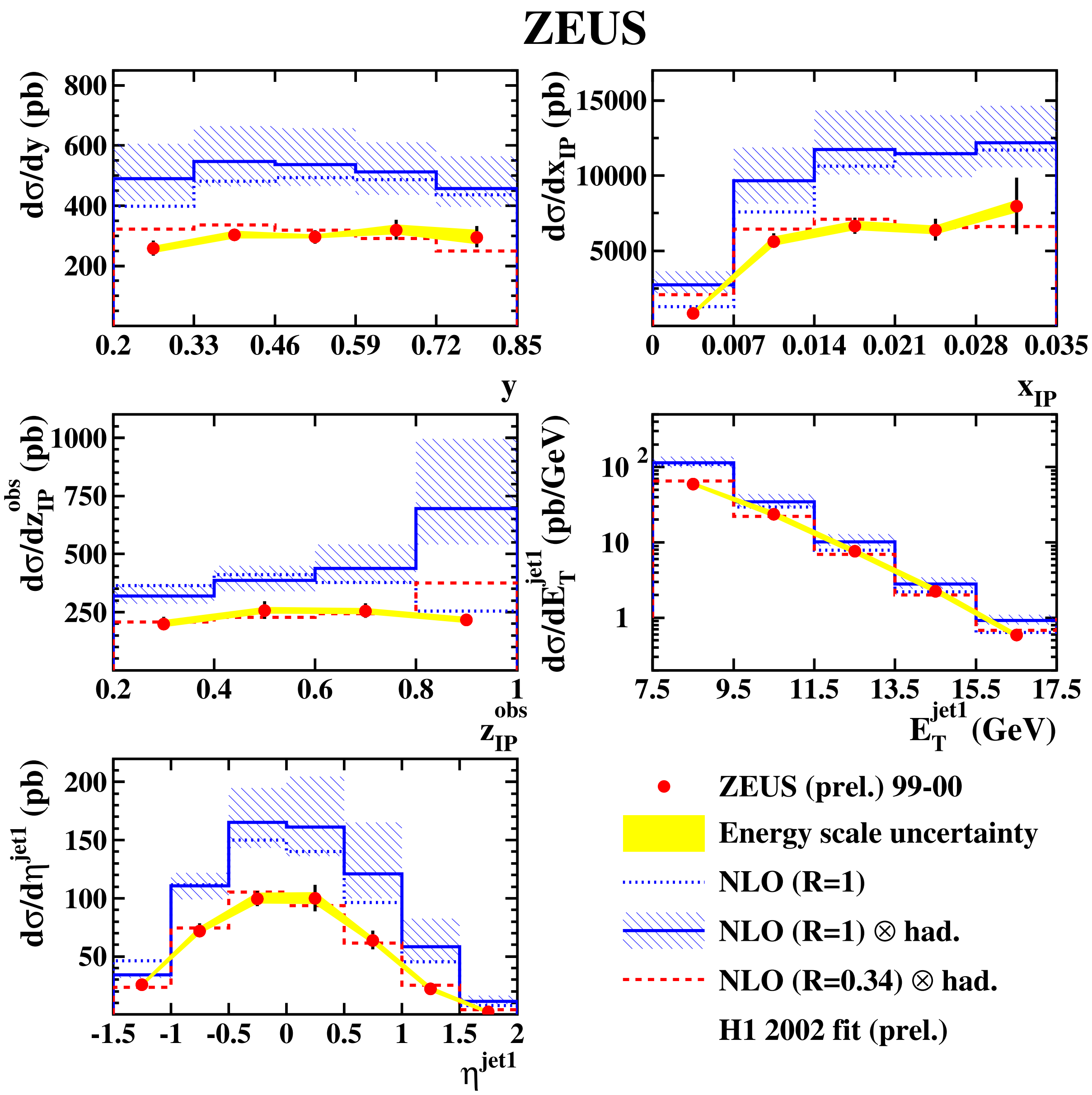
Comparison with NLO predictions

- NLO calculations by Klasen and Kramer for partonic level
- corrections to hadron level estimated using RAPGAP MC



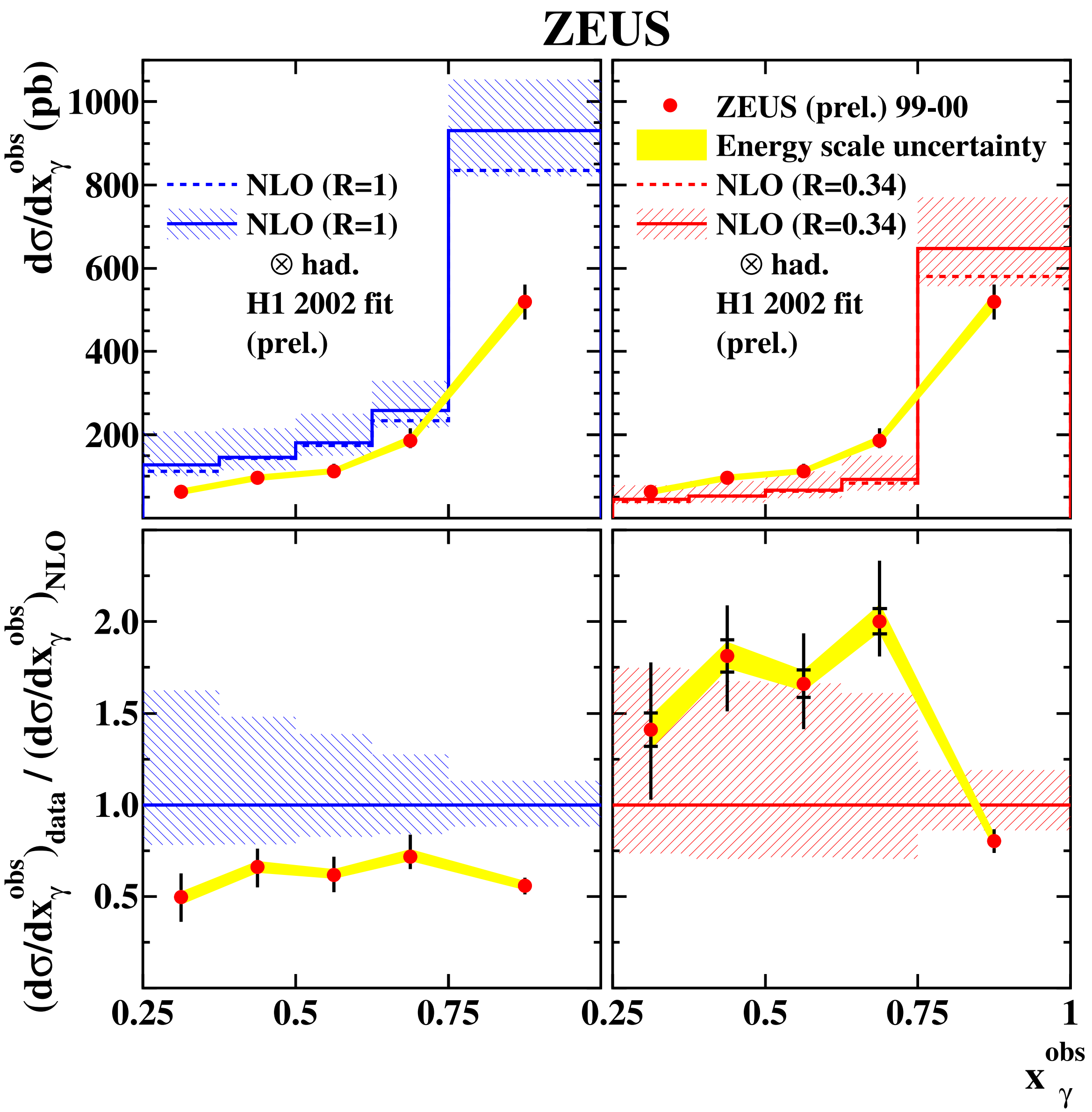
Comparison with NLO predictions

- corrections to hadron level estimated using RAPGAP MC
- corrections in x_γ are not large



Data vs NLO

- $y, x_{I\!P}, z_{I\!P}, E_T^{jet}, \eta_T^{jet}$
- shape described
- normalization not described, a suppression factor is needed



Data vs NLO - x_γ

- normalization not described, a suppression factor is needed
- the same suppression factor seems to be applied to both resolved and direct components

Diffractive Dijet in Photoproduction - Summary

- Cross sections measured by ZEUS
- Data described by LO MC RAPGAP
- NLO describe shape of data
- NLO need a suppression factor ~ 0.5
- Data favour a suppression also of the direct γ component

Next steps:

- double differential cross sections
- ratio of diffractive/total cross section