

Inelastic J/ψ differential cross sections with ZEUS at HERA

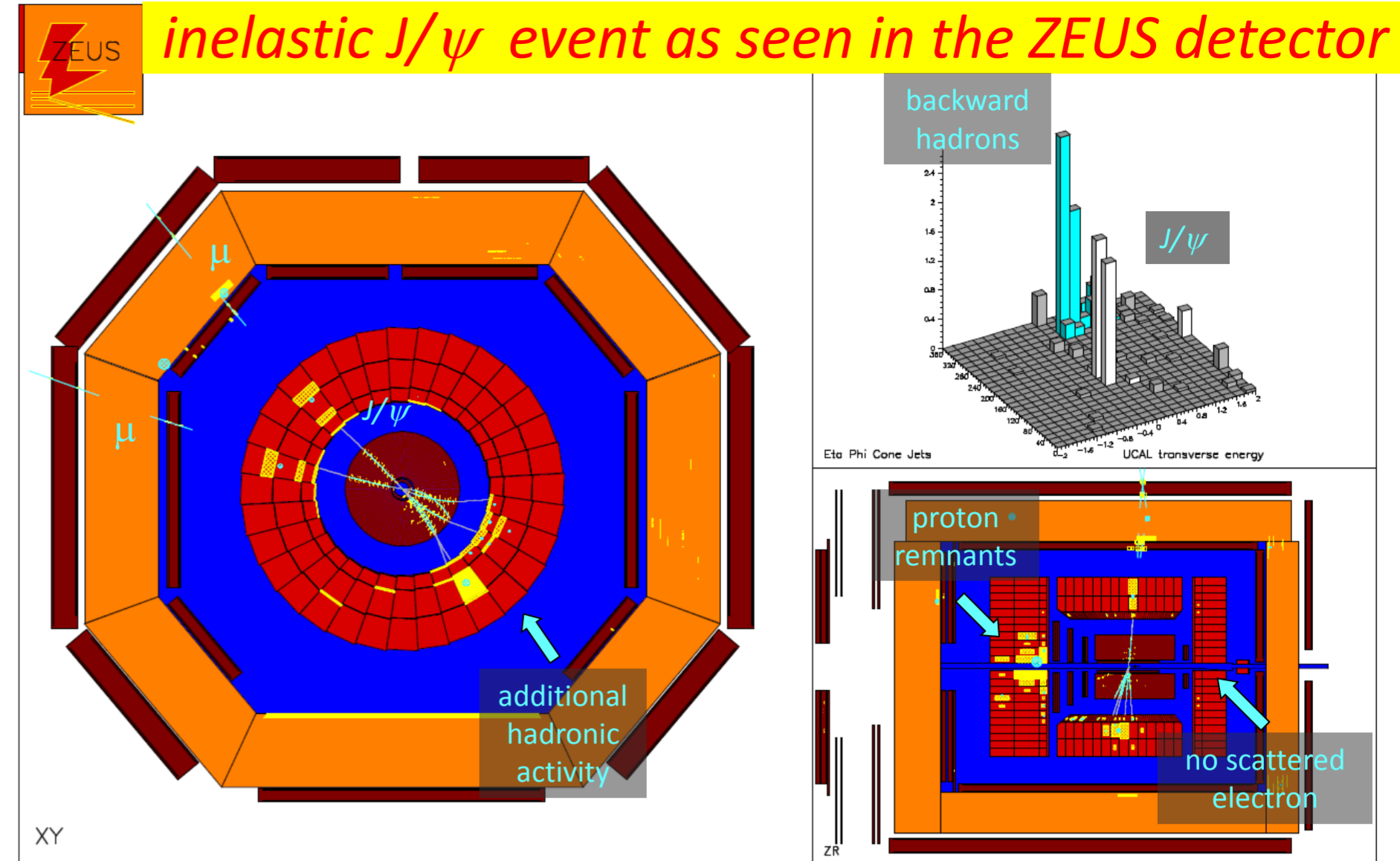
A. Bertolin (INFN – Sezione di Padova) on behalf of the ZEUS collaboration

the HERA collider: a brief introduction



- HERA was an $e p$ collider at high CMS energy (this was like having an about 50 TeV e beam on fixed target)
- ZEUS was a large multipurpose experiment studying $e p$ collisions
- “effective” running started in 1996 and ended mid 2007
- ZEUS lumi.: all data taken since 1996, 11 years of activity, 468 pb^{-1} of integrated lumi.

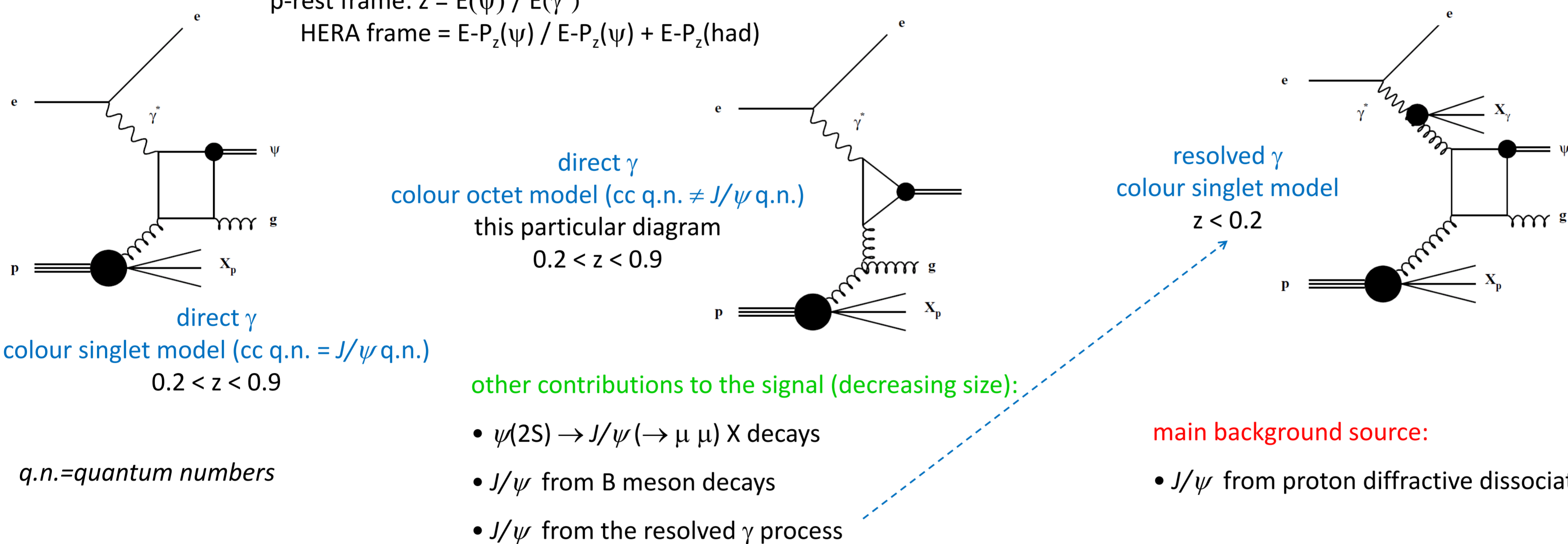
inelastic J/ψ event as seen in the ZEUS detector



- proton remnant + additional hadronic activity: **inelastic event**
- no scattered electron: **photoproduction regime** ($Q^2 < 1 \text{ GeV}^2$)

charmonium production at HERA (J/ψ and $\psi(2S)$)

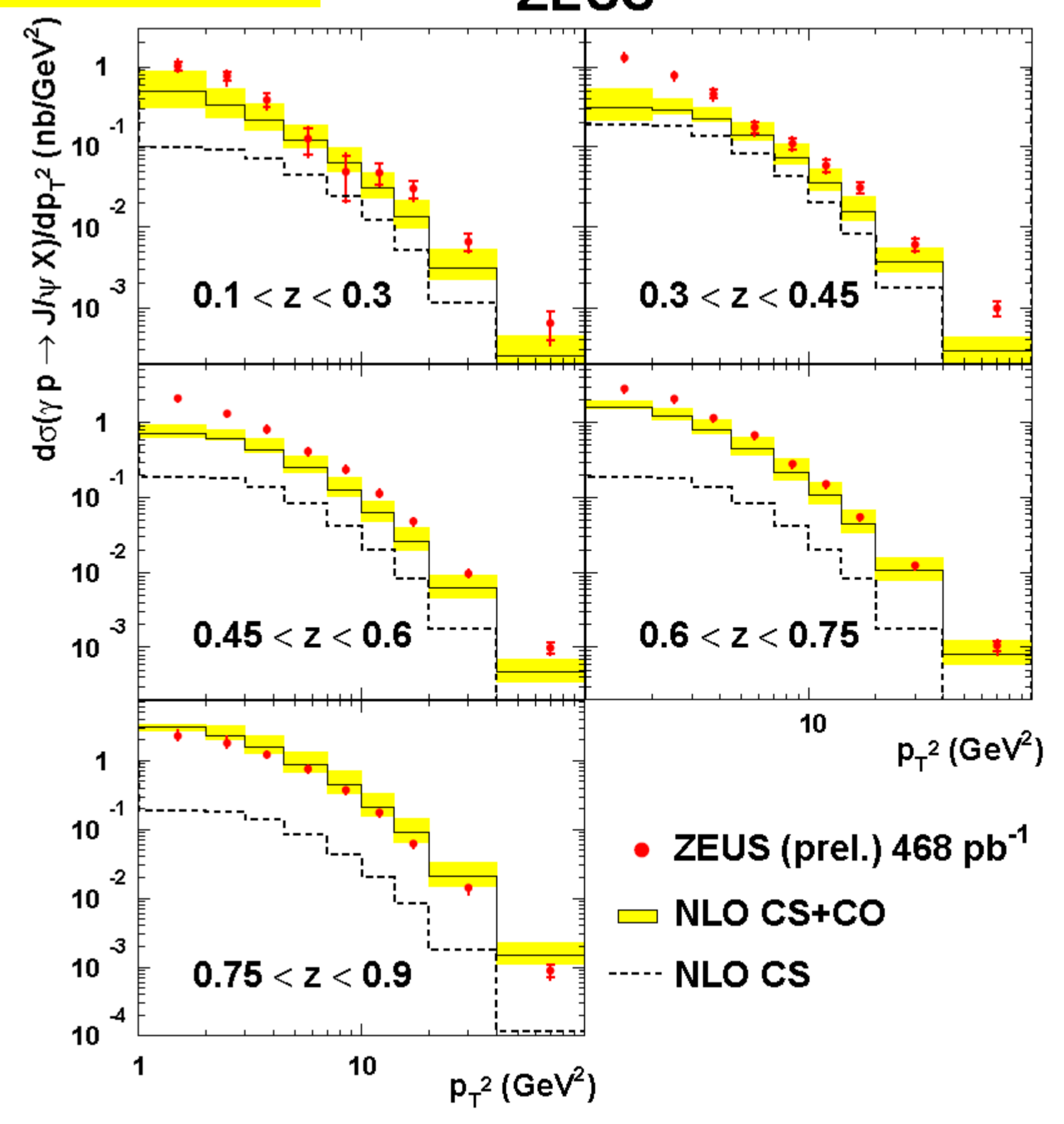
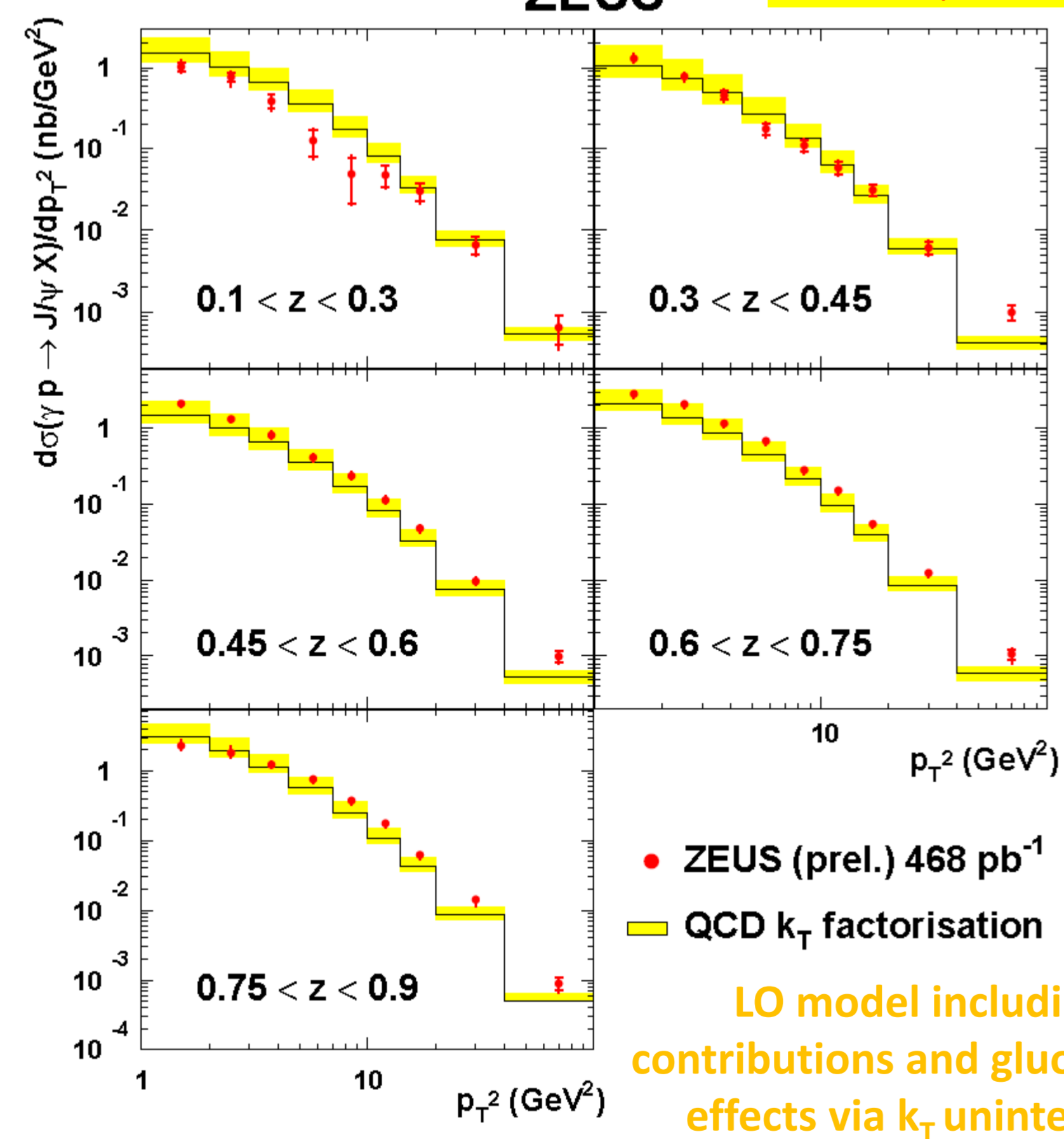
p-rest frame: $z = E(\psi) / E(\gamma^*)$
 HERA frame = $E - P_z(\psi) / E - P_z(\psi) + E - P_z(\text{had})$



ZEUS

J/ψ p_T^2 photoproduction cross section: data vs theory

ZEUS



full NLO calculation including, for the first time, color singlet and color octet contributions

- ✓ k_T factorization provides a good description of the data
- ✓ does gluon k_T mimics NLO effects ?
- ✓ full NLO calculation available for the first time !
- ✓ NLO provides a good description of the data except for $0.3 < z < 0.6$ at low p_T , discrepancy vanishes as p_T increases