Inelastic J/ψ differential cross sections with ZEUS at HERA

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**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.

**Charmonium Production at HERA (J/ψ and ψ(2S))**

- J/ψ: p_T² photoproduction cross section: data vs theory

- LO model including only color singlet contributions and gluon transverse momentum effects via k_T, unintegrated gluon densities

- 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