

Forward diffractive gauge bosons production at the LHC

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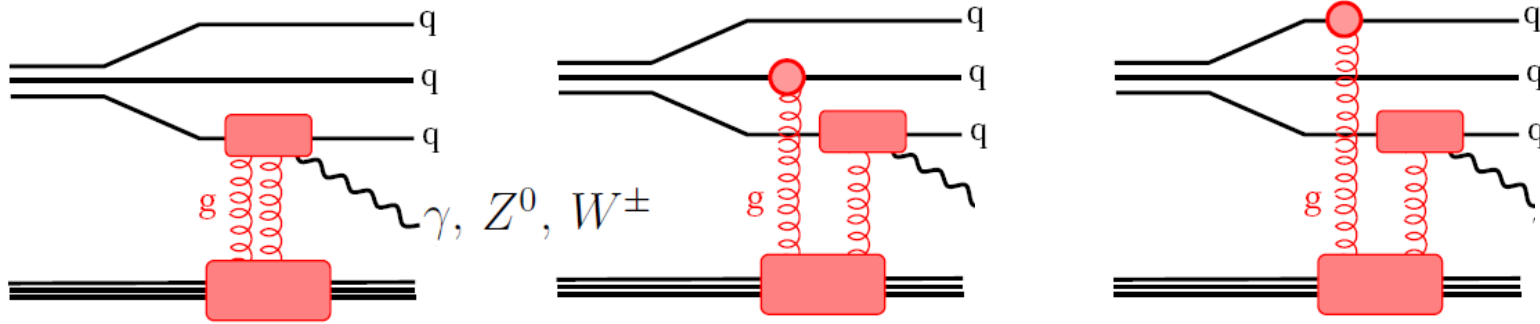
Lund University, THEP group

2012 Annual CMS Workshop on Forward & Small-x QCD Physics
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...Probing large distances in the proton

R. Pasechnik, B. Kopeliovich, *Eur. Phys. J. C71: 1827, 2011*

B. Kopeliovich, I. Potashnikova, I. Schmidt and A. Tarasov, *Phys. Rev. D74: 114024, 2006*



GBW dipole

$$\sigma(r) = \sigma_0 \left(1 - e^{-r^2/R_0^2}\right)$$

Amplitude $\propto \sigma(\vec{R}) - \sigma(\vec{R} - \alpha\vec{r}) = \frac{2\alpha\sigma_0}{R_0^2(x_2)} e^{-R^2/R_0^2(x_2)} (\vec{r} \cdot \vec{R}) + O(r^2)$

Interplay between hard and soft scales

Diffractive DIS $\propto 1/M^4$

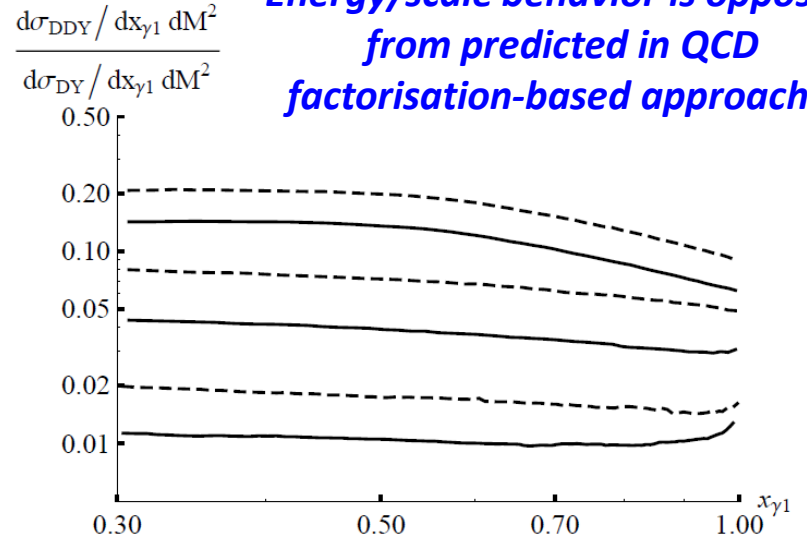
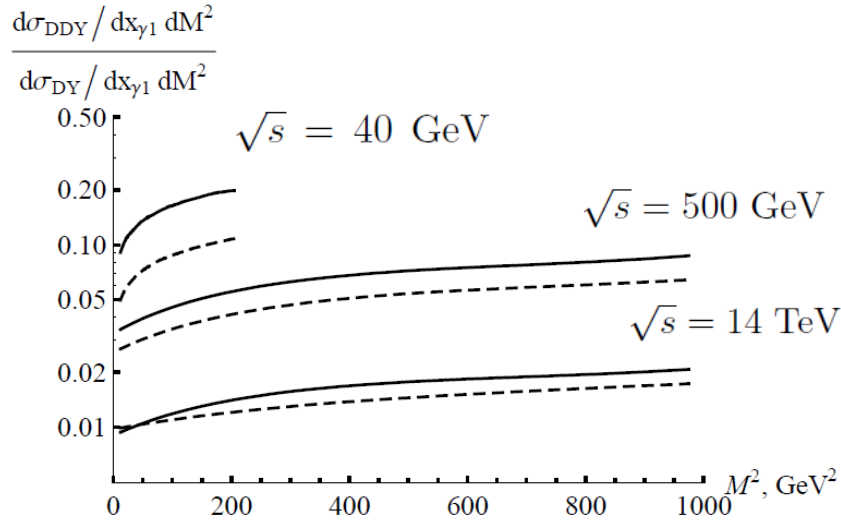
Diffractive gauge bosons production $\propto 1/M^2$

QCD factorization holds!

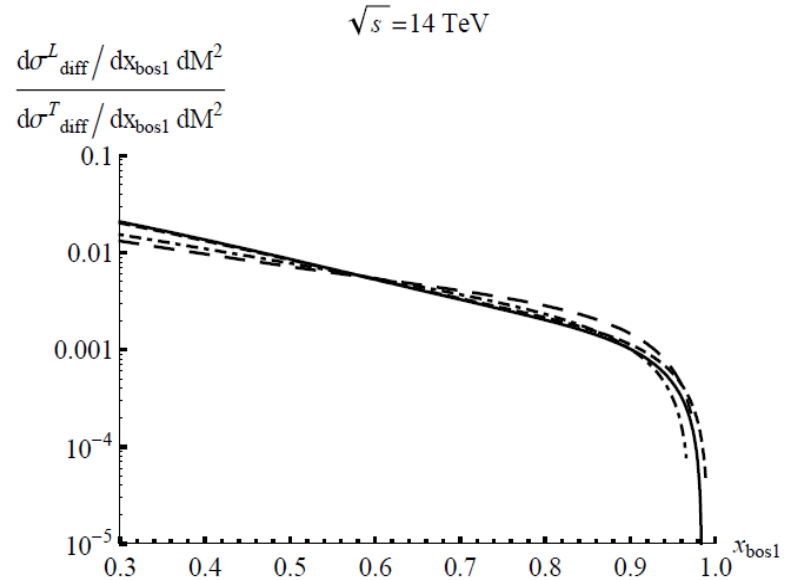
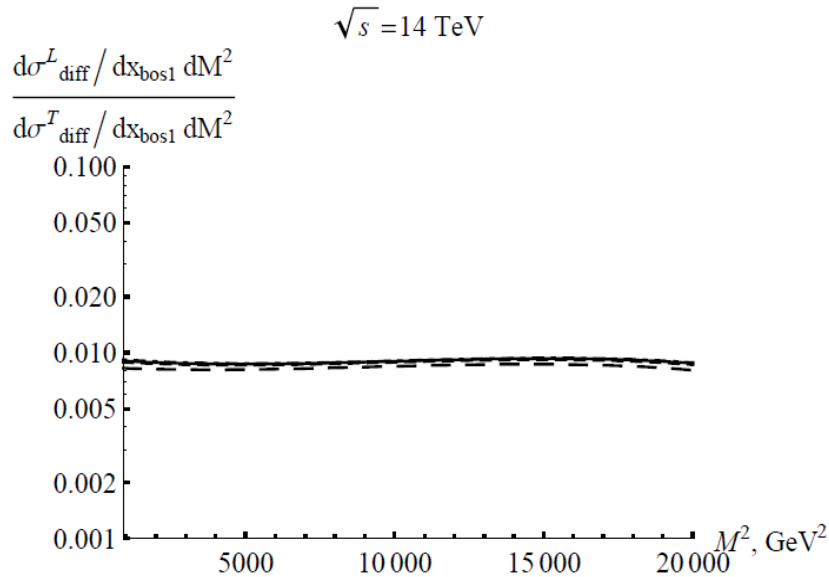
QCD factorization is broken!

Diffractive vs inclusive

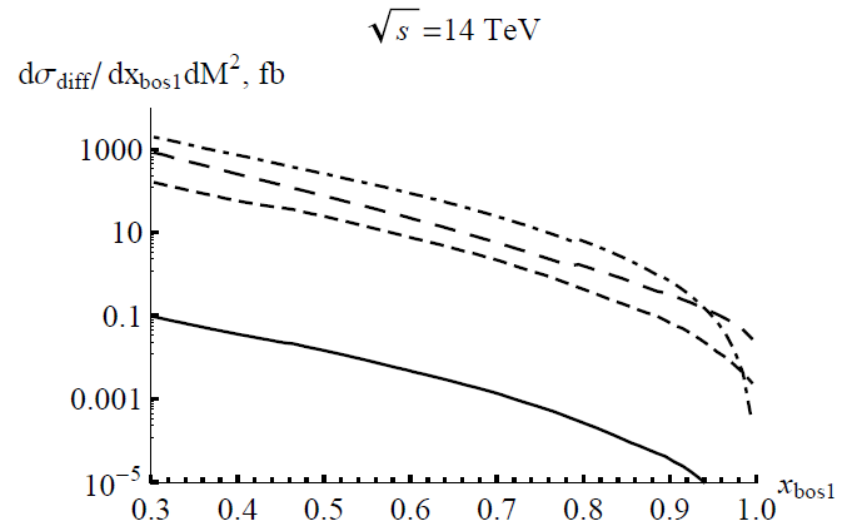
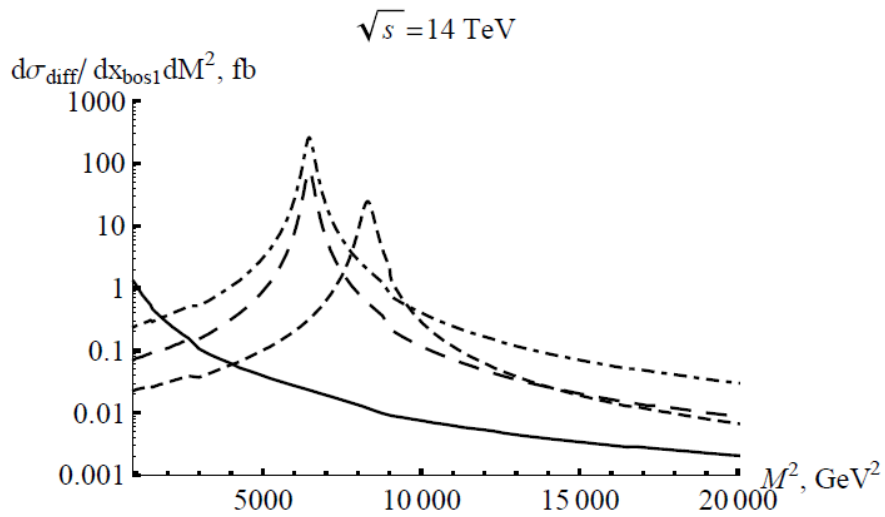
Energy/scale behavior is opposite from predicted in QCD factorisation-based approaches



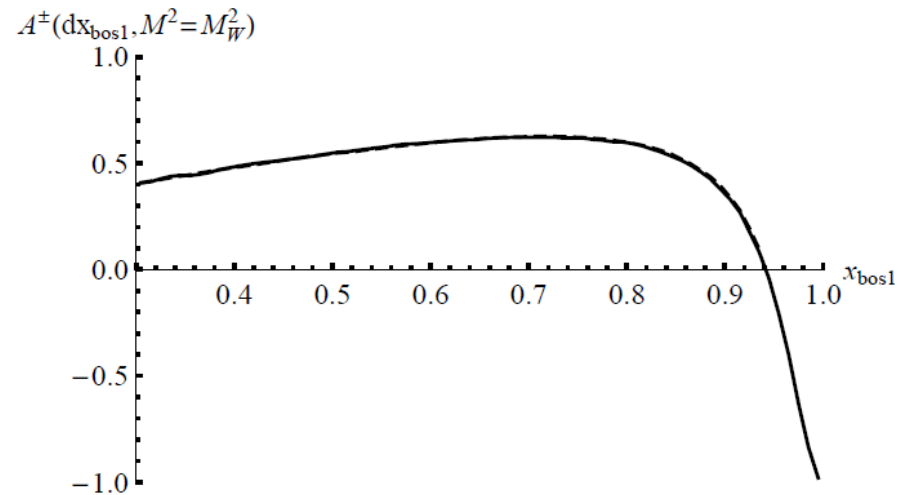
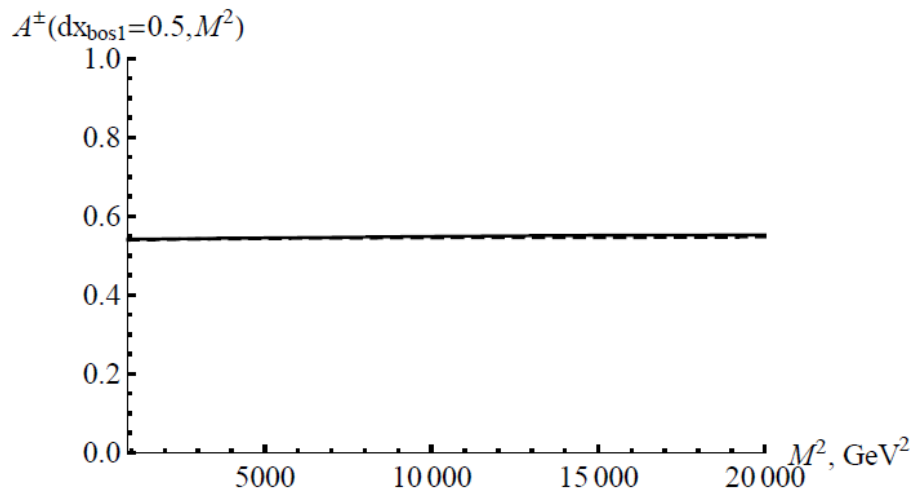
Longitudinal vs transverse



Cross section



W asymmetry



Forward GB measurement can improve our understanding of the proton structure in the non-perturbative region