

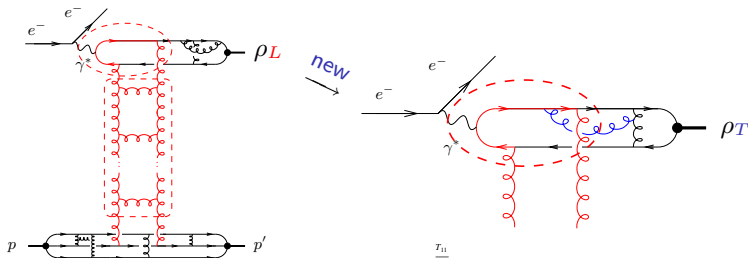
Exclusive vector meson production with tagged out-going p/A

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in collaboration with

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Diffractive exclusive process $e^- p \rightarrow e^- p \rho_{L,T}$ 

first description combining beyond leading twist

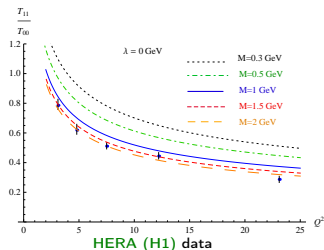
- collinear factorisation
- k_T -factorisation

I. V. Anikin, D. Yu. Ivanov, B. Pire, L. Szymanowski, S.W.

Phys.Lett.B682 (2010) 413-418

Nucl.Phys.B828 (2010) 1-68

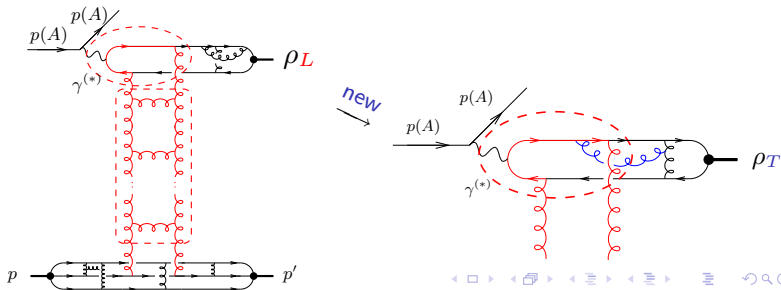
HERA, LHeC project



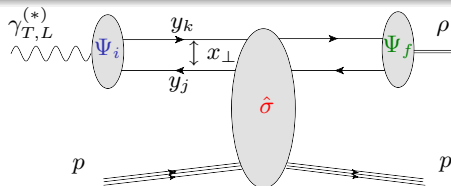
I. V. Anikin, A. Bessie, D. Yu. Ivanov, B. Pire,
L. Szymanowski, S.W.
Phys.Rev. D84 (2011) 054004

Diffractive exclusive process $p(A) p \rightarrow p(A) p \rho_{L,T}$

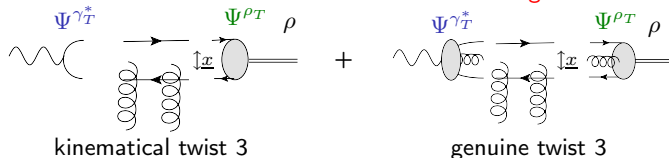
- For large impact parameter, γ exchange from $p(A)$ dominates the pure strong-interaction processes: **Ultra-Peripheral Collisions**
 - Coulomb pole for UPC $1/p_T^2$ versus $\exp(-B p_T^2)$ for strong interaction events
 - in heavy ion mode, detection of neutrons produced by the giant dipole resonance as a signal of UPC
 - γ , i.e. $\gamma^*(Q^2)$ with $Q^2 \simeq 0$ strongly dominates the Weizsäcker-Williams spectrum
 - **Hard scale = $-t$**
- Can one tag the outgoing p or A in order to get access to $\gamma^*(Q^2)$ with $Q^2 \gg \Lambda_{QCD}^2$ at LHC?



Dipole representation and saturation effects



- Initial Ψ_i and final Ψ_f states wave functions of projectiles
- Universal scattering amplitude $\hat{\sigma} \equiv \hat{\sigma}_{\text{dipole-target}}$ Golec-Biernat Wusthoff
 - color transparency for small x_{\perp} : $\hat{\sigma}_{\text{dipole-target}} \sim x_{\perp}^2$
 - saturation for large $x_{\perp} \sim 1/Q_{\text{sat}}$: $T < 1$
- The dipole representation is consistent with the twist 2 Collinear approximation
- **New: still consistent with collinear factorization at higher twist order:**



A. Besse, L. Szymanowski, S. W., to appear

γ case for large $|t|$?
Phenomenology?