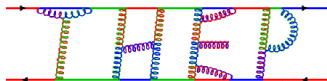


Charge asymmetry in diffractive W production

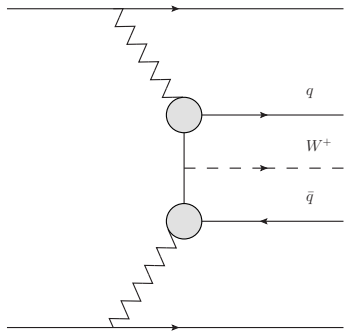
Dominik Werder
Uppsala Universitet

- ▶ DPE vs. SCI model
- ▶ Source of asymmetry



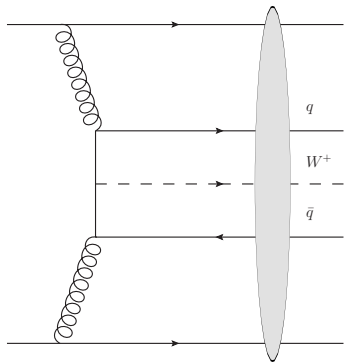
Via double Pomeron exchange

- ▶ Pomeron flux from initial protons
- ▶ Hard scale resolves Pomeron content
- ▶ Vacuum quantum number exchange
- ▶ Diffractive PDFs are symmetric
 $u = \bar{u}$ and $d = \bar{d}$
- ▶ $A(W_Y) = \frac{W^+ - W^-}{W^+ + W^-}$
- ▶ No $W^{+/-}$ asymmetry possible



Via soft color interactions

- ▶ Produce W the inclusive way first
- ▶ Hard matrix element
- ▶ Parton showers
- ▶ Add soft color interactions
Can change color topology
- ▶ Intact final proton only possible if flavor content is right
- ▶ Last splitting must come from gluon
- ▶ Splitting from gluon is flavor blind
- ▶ No $W^{+/-}$ asymmetry possible



The issue

Model predictions: [1]

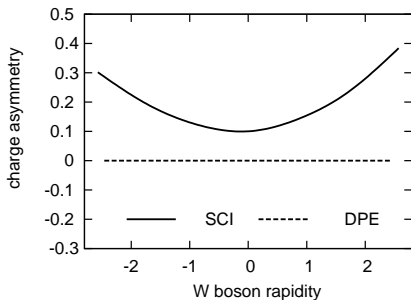
- ▶ No asymmetry in DPE based MC: By construction
- ▶ Charge asymmetry in Pythia 6.215 plus SCI

The observable:

- ▶ W plus two intact forward protons

[1] arXiv:1110.1825v1

$$A(W_Y) = \frac{W^+ - W^-}{W^+ + W^-}$$



Investigate Pythia/SCI based model

Pythia 6.215 (PYEVNT) plus
SCI

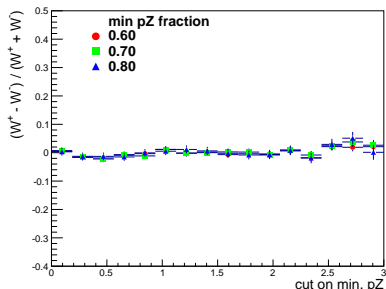
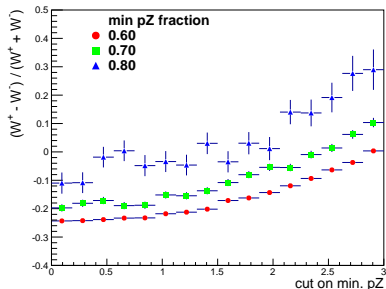
- ▶ W asymmetry model prediction was reproduced

Pythia 6.426 (PYEVNW) plus
SCI:

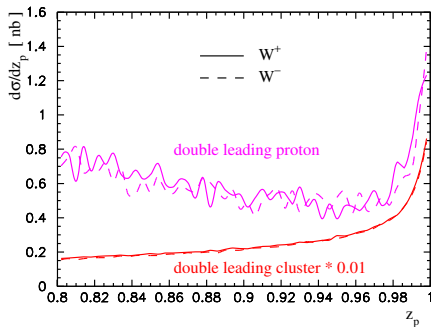
- ▶ No asymmetry predicted

Interesting:

- ▶ W asymmetry already present in 6.215 without SCI and with symmetrized PDF



Very forward region



- ▶ Forward diffractive peak
- ▶ Contamination from non-double-diffractive events for small x_F cut

Summary

- ▶ W asymmetry not visible in recent Pythia plus SCI
- ▶ Artifact of remnant and underlying event handling
- ▶ Low cut on x_F contaminates diffractive sample