

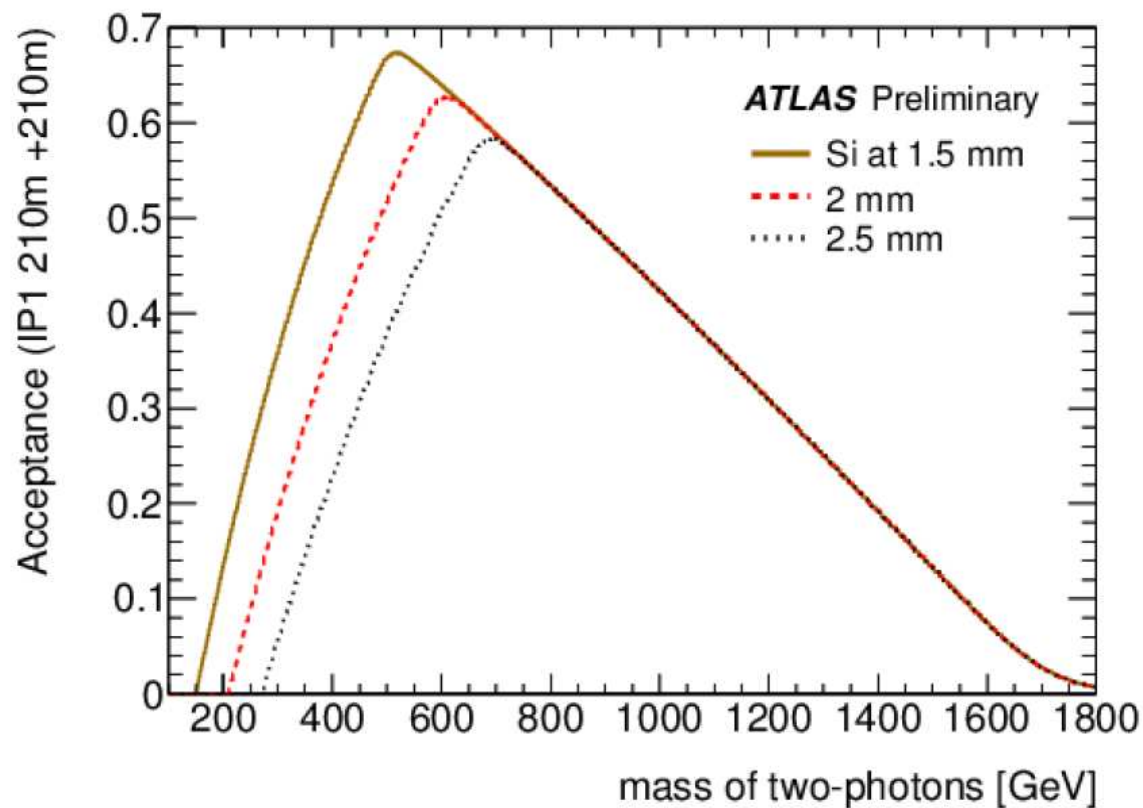
Magnetic monopoles and high ξ background

Christophe Royon
IRFU-SPP, CEA Saclay, France

LHC Forward Physics WG meeting, CERN, August 25-26 2013

- Introduction
- Search for magnetic monopoles, invisible objects
- High ξ background
- Reggeon contribution at high ξ
- Many contributions from Philippe Mermod, Rafal Staszewski, Laurent Schoeffel... NB: more a talk to open discussions than to show new results

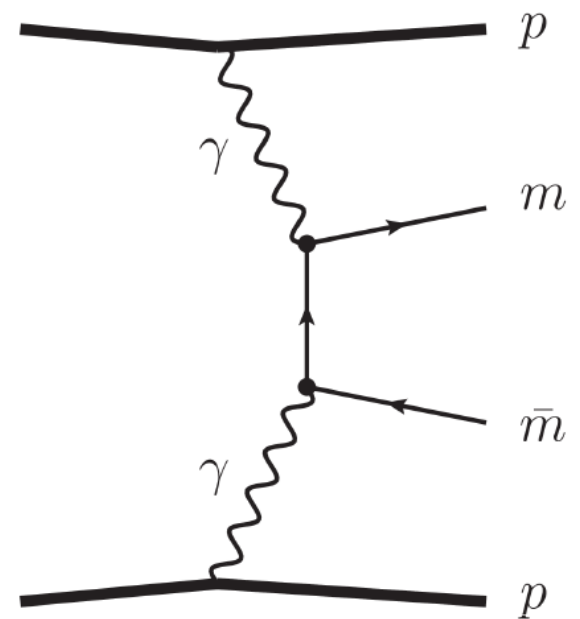
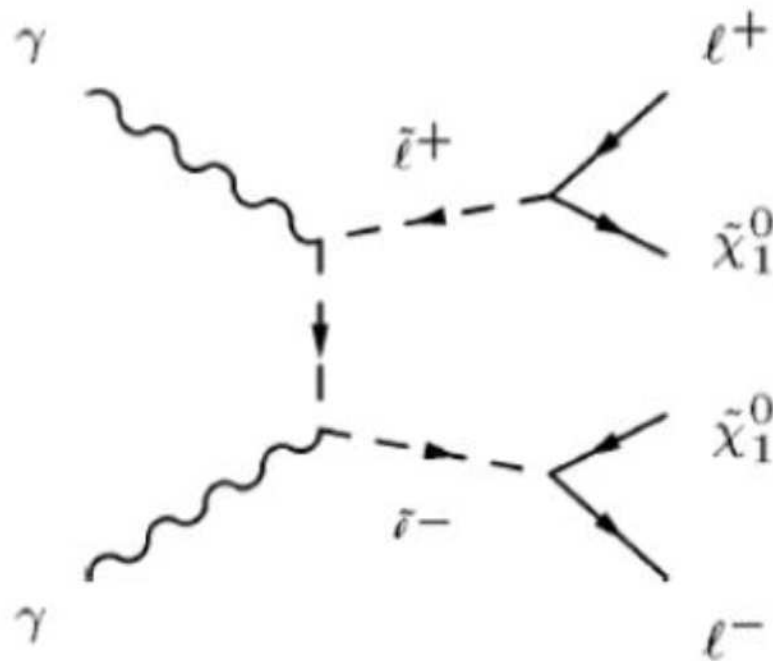
AFP and PPS acceptance in total mass



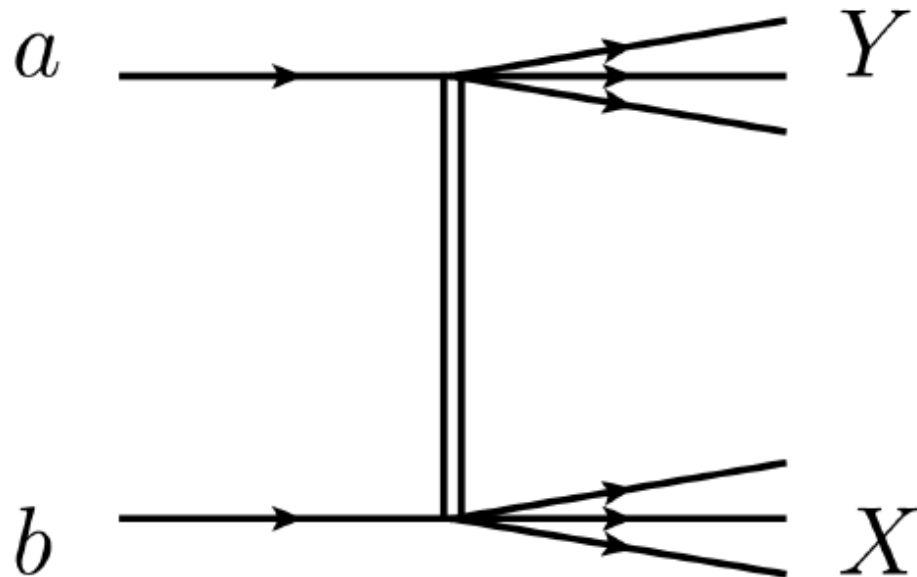
- High mass acceptance useful to study electroweak coupling via $WW\gamma\gamma$, $ZZ\gamma\gamma$, $\gamma\gamma\gamma\gamma$ couplings
- Any particle (single or pair) production can be interesting to study if cross section is high enough: we can measure the masses of the (s)particles precisely using the missing mass method, good precision since not sensitive on neutralino mass for instance
- Invisible objects

Case of “invisible” objects

- SUSY slepton mass measurement, NMSSM?
- Monopole: Unique signature of high mass object seen in AFP ($M = \sqrt{\xi_1 \xi_2 S}$) and nothing visible in ATLAS: monopole can be stopped in the beam pipe
- **Trigger:** rate depends on high ξ background
- High ξ background needs to be measured from data

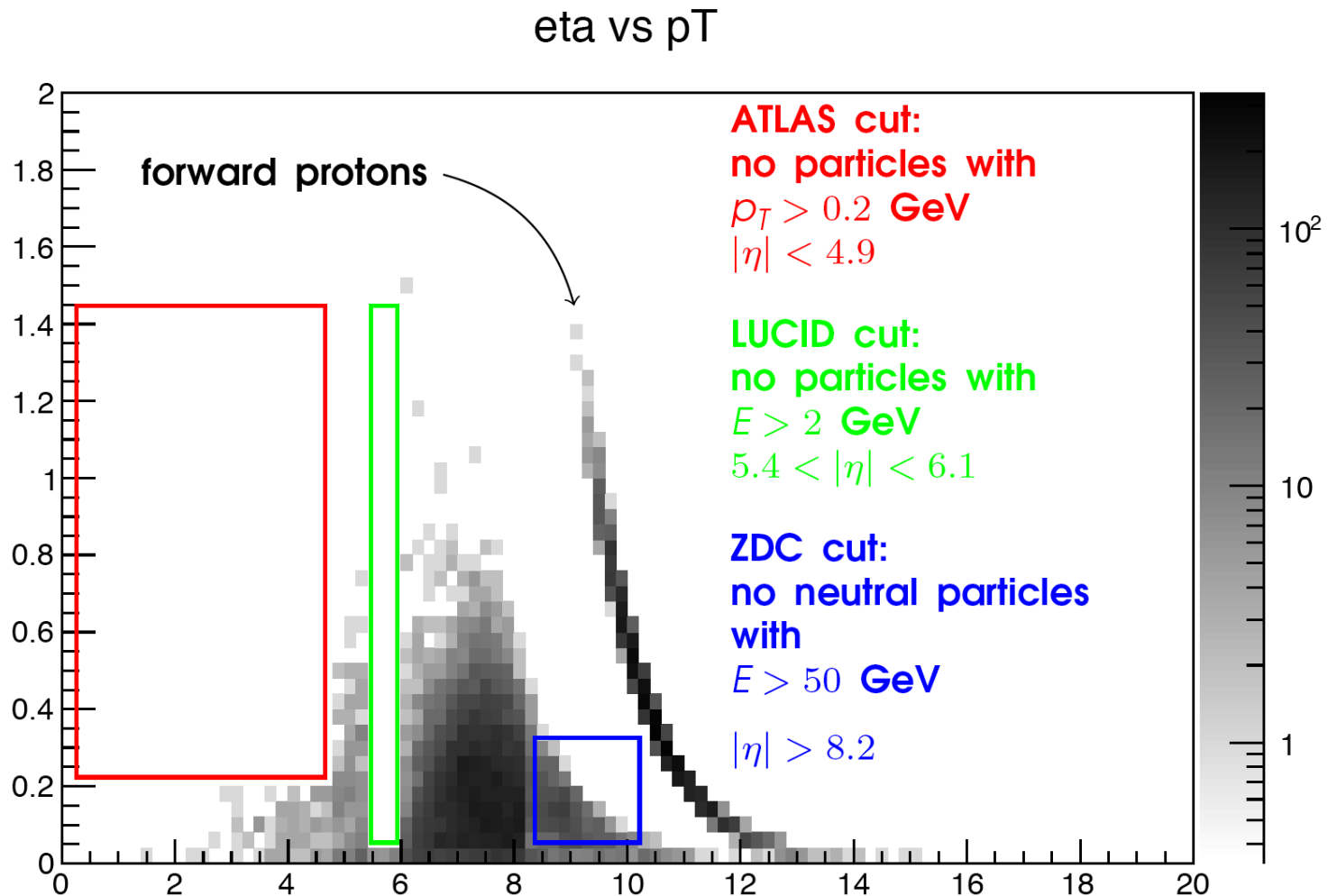


Double diffractive background



- Double diffraction cross section is huge (pythia8): 100 mb
- What is the uncertainty of this number? As far as we know, it has never been measured... What about TOTEM data?
- After cuts (requiring no activity in ATLAS, LUCID, ZDC, protons tagged in AFP: > 100 nb after the cuts...

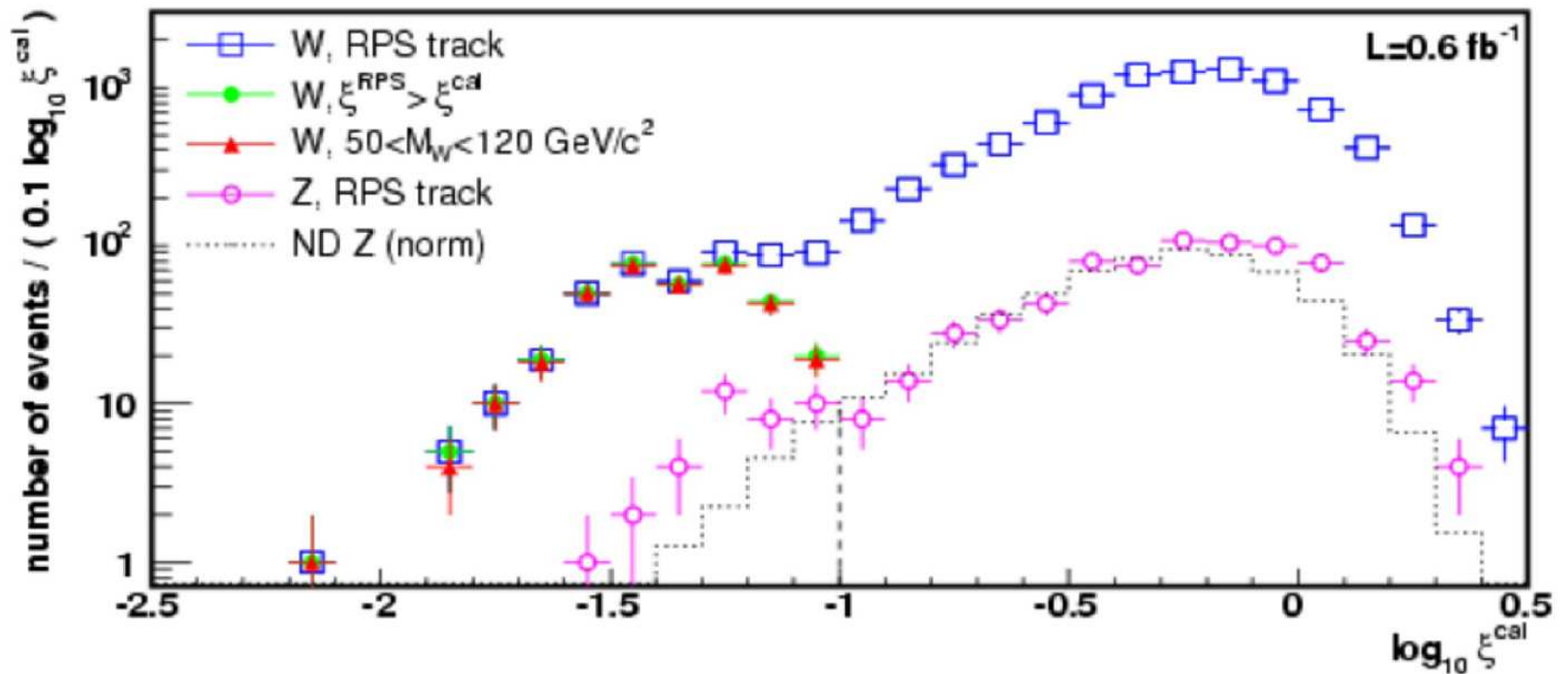
Eta vs p_T distribution



- Huge contribution from double diffractive events
- Forward shower counters can help (coverage around a rapidity of 7)
- In addition, need to consider pile up...
- Important to know if we can trust these numbers from pythia or not...

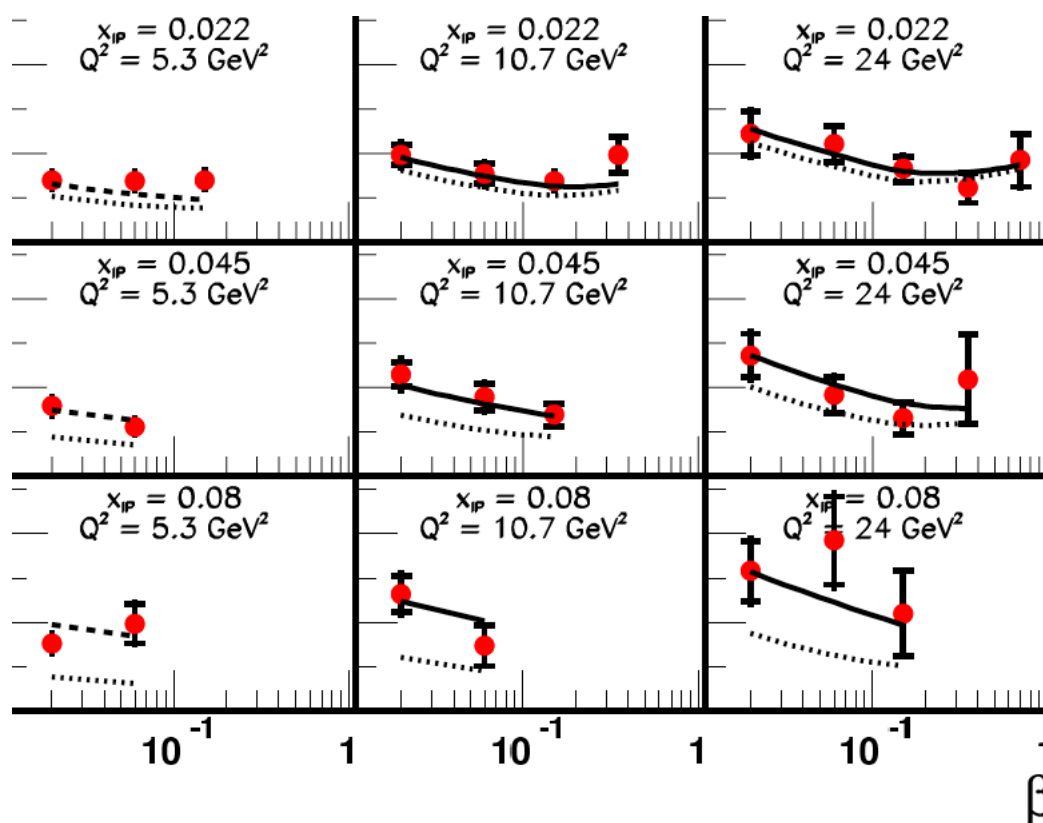
What about CDF?

- CDF sees high ξ background with \bar{p} tagged
- To be discussed with CDF people



Reggeon contribution at high ξ ?

- Reggeon and Pomeron components measured at HERA, example of H1
- Reggeon contribution dominates above $\xi \sim 0.05$
- What about pp colliders, LHC?
- Probably does not make much sense to extrapolate HERA determination (in H1 the pion structure function is used but probably only ad-hoc parametrisation only valid at HERA energies)
- To be measured at LHC, important for structure of pomeron studies, beyond standard model



Conclusion

- Many studies to be done at high luminosity: study of electroweak sector (“anomalous coupling” studies), measurement of the mass of produced object such as SUSY, what about NMSSM?
- Search for monopole or invisible object: depends strongly on unknown background at high ξ : can we trust numbers from MC?
- Reggeon contribution?
- Many high ξ measurement to be performed using Totem, Alfa, PPS, AFP