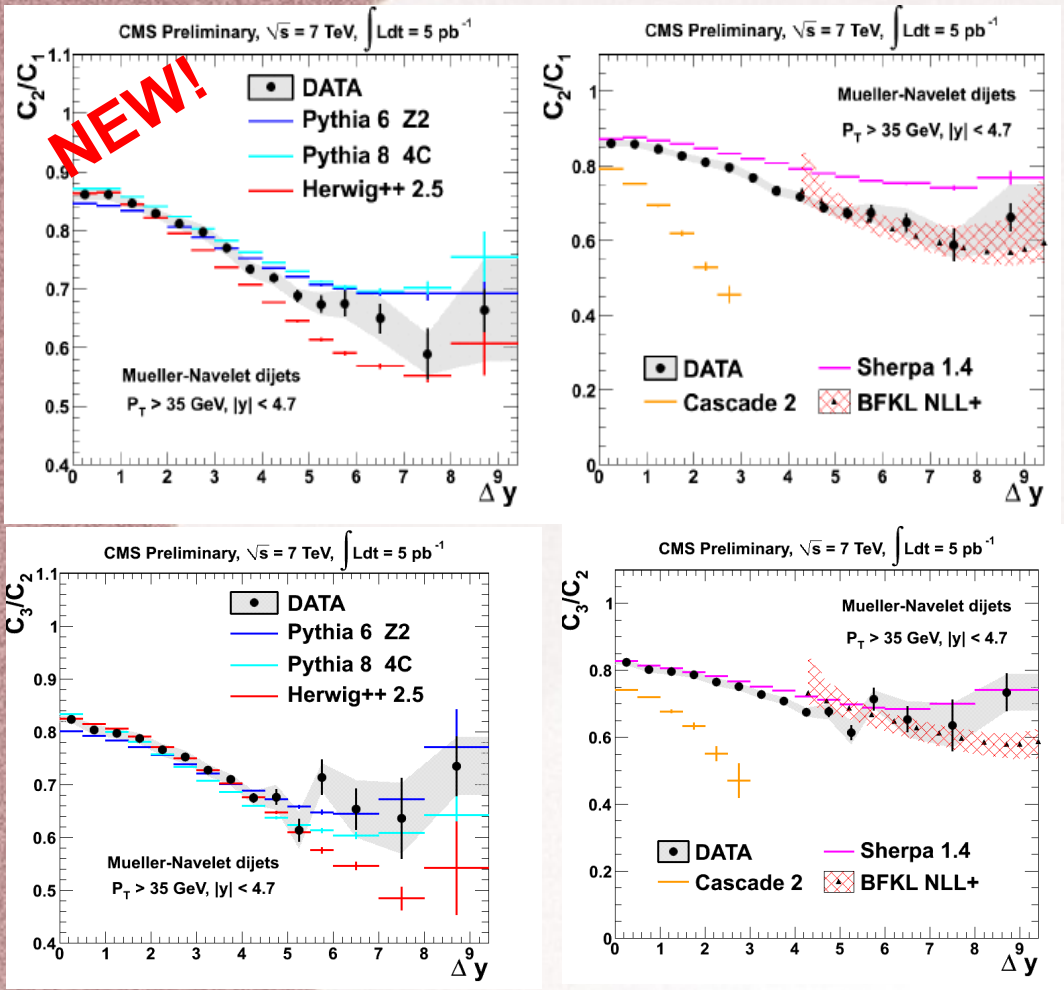
Small-x, Diffraction, and Vector Mesons

WG2 Experimental Summary (a biased and incomplete selection)

Jonathan Hollar for WG2

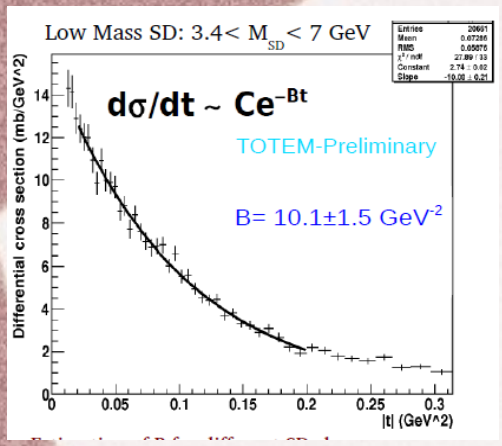
New dynamics at small-x?



- CMS: Measurement of azimuthal decorrelations + cosines of Fourier coefficients for dijets separated in rapidity (up to $\Delta Y<9.4$)
- Cosine ratios consistent with NLL BFKL predictions, but some DGLAP MC's (especially HERWIG++) are also OK overall
- Together with other LHC forward jet measurements: no smoking gun for (or against) "beyond DGLAP" dynamics yet

A.Knutsson

Inclusive diffraction



M. Berretti

NEW!

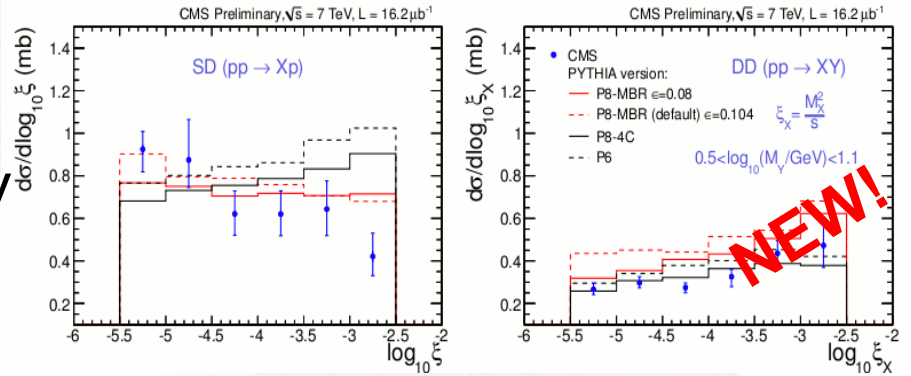
- TOTEM: measurements of Single/Double diffractive cross sections at 7 TeV using proton tagging

Very Preliminary:
$\sigma_{SD}(3.4<M_{SD}<1100\ \text{GeV}) = 6.5 \pm 1.3$ mb

- CMS: Single/Double diffractive and gap cross sections measured at 7 TeV

$\sigma^{SD}_{vis} = 4.27 \pm 0.04\ (\text{stat.})\ ^{+0.65}_{-0.58}\ (\text{syst.})$ mb for $-5.5 < \log_{10}\xi < -2.5$

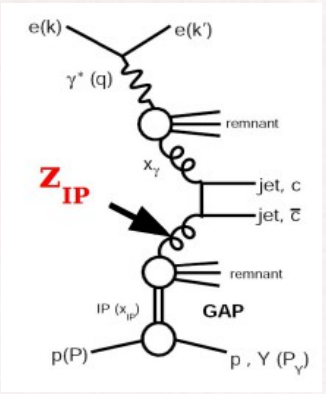
$\sigma^{DD}_{vis} = 0.93 \pm 0.01\ (\text{stat.})\ ^{+0.26}_{-0.22}\ (\text{syst.})$ mb for $\Delta\eta > 3$, $M_X > 10$ GeV, $M_Y > 10$ GeV

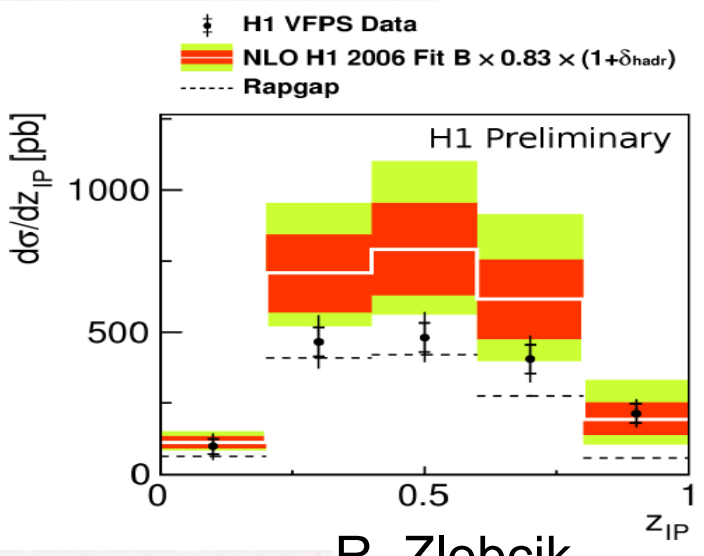


R. Ciesielski

Hard diffraction

- H1: measurement of proton-tagged diffractive dijet photoproduction
- Hints of “factorization breaking”, consistent with untagged H1 analysis





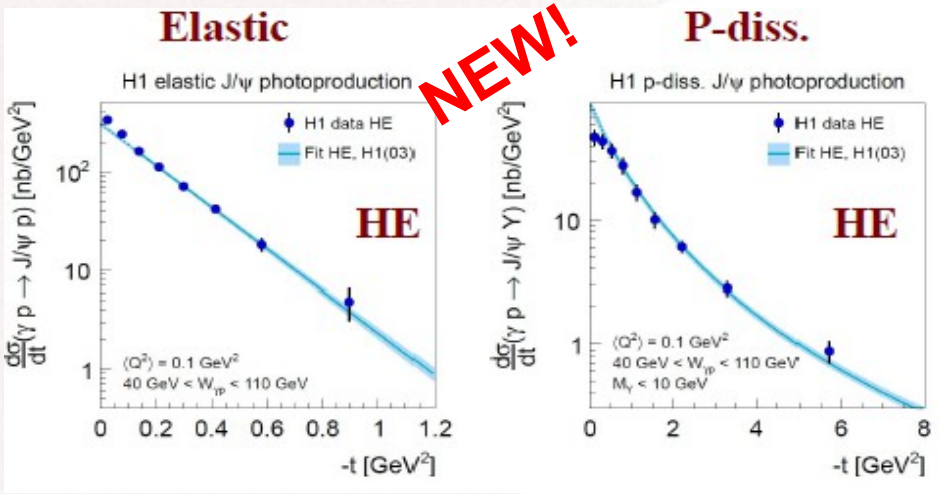
R. Zlebcik

Gap survival probability $0.67 \pm 0.10(\text{exp.}) \pm 0.24(\text{theor.})$

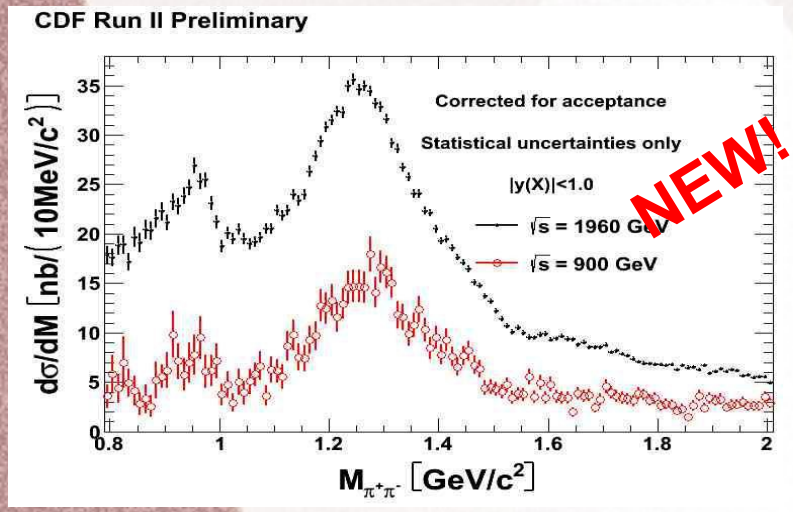
- But – suppression is less than the ~10% seen in hadron colliders
- Zeus sees no effect in untagged analysis

Exclusive processes: from HERA and Tevatron...

- H1: Precision measurement of elastic and p-dissociative J/ψ to low |t|
  - Consistent with pQCD-inspired predictions
  - Important input for LHC experiments



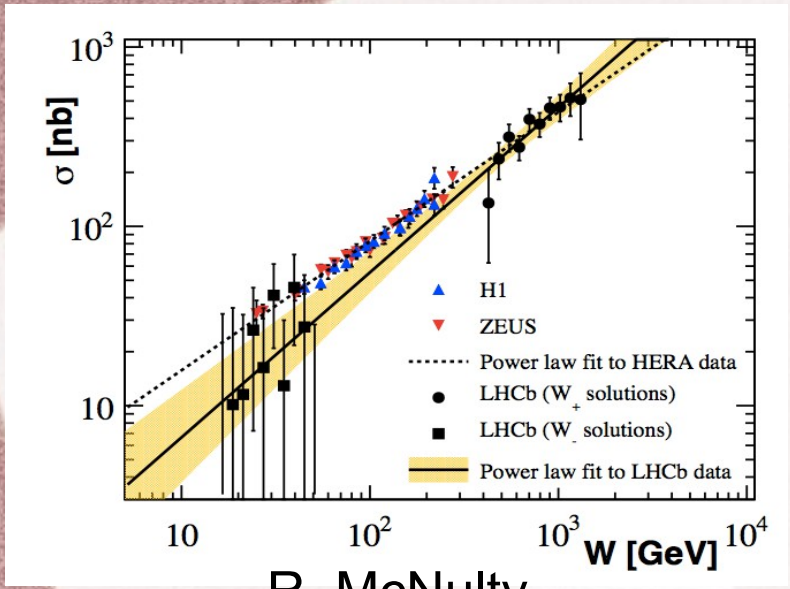
N. Gogitidze



K. Goulianos

- CDF: Many exclusive processes measured (J/ψ, χ_c, $\gamma\gamma$, dijets) previously as exclusive Higgs benchmarks
  - New results on $\pi^+\pi^-$ - complicated resonance structure under study

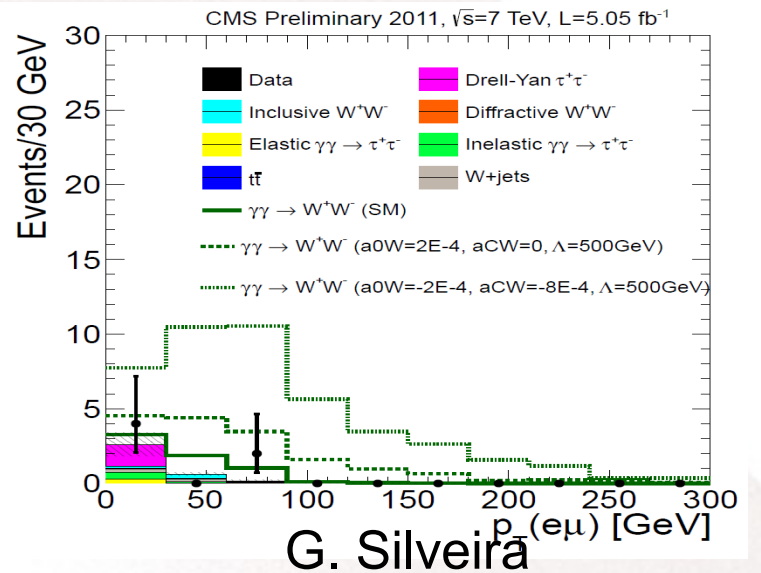
… to LHC in pp…



R. McNulty

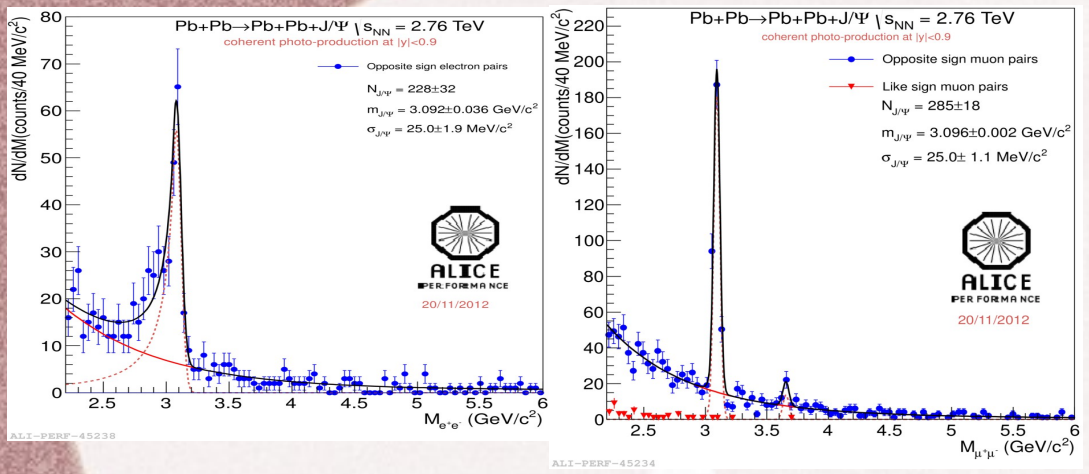
- LHCb: exclusive J/ψ photoproduction at 7 TeV
  - Cross section dependence on W(γp) consistent with HERA data
  - Extends range of W to ~1 TeV

- CMS: search for $\gamma\gamma \to WW$ scattering at 7 TeV
  - 2 candidates observed, resulting limits on anomalous quartic $\gamma\gamma WW$ couplings ~100x beyond LEP



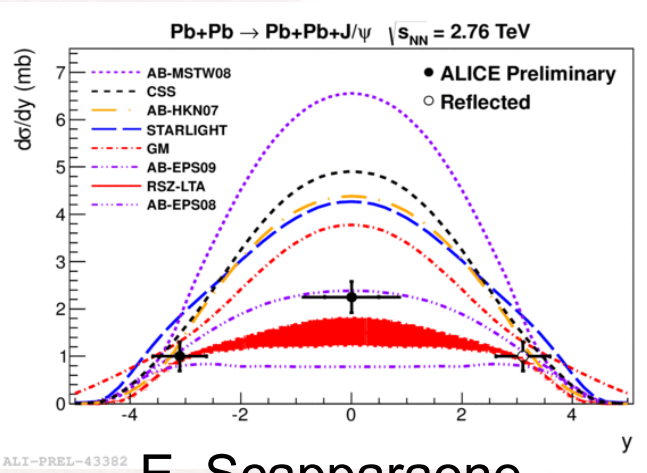
G. Silveira

… and Heavy Ions



- Alice: Ultra-peripheral coherent and incoherent J/ψ photoproduction measured in Pb-Pb collisions at 2.76 TeV

- Wide range of predictions – data is consistent with models including nuclear gluon shadowing
  - p-Pb results for UPC J/ψ on the way

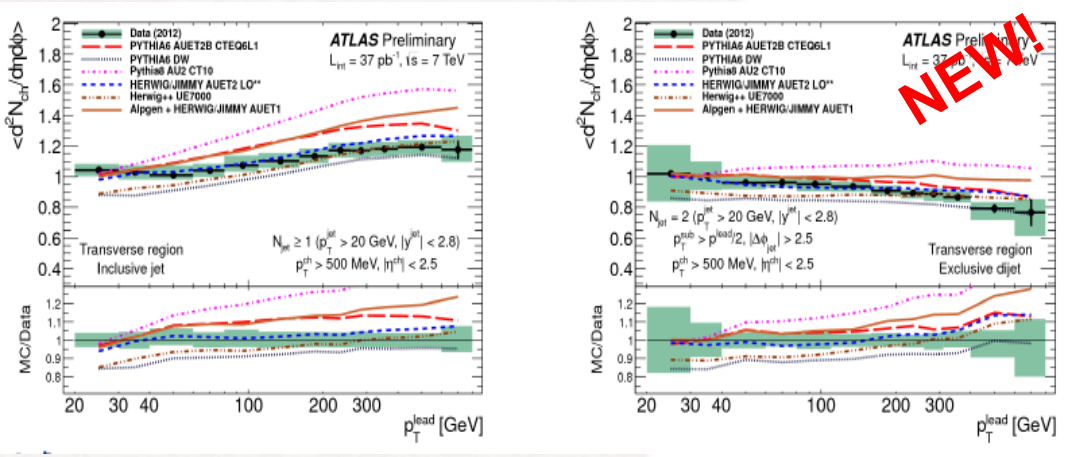


E. Scapparaone

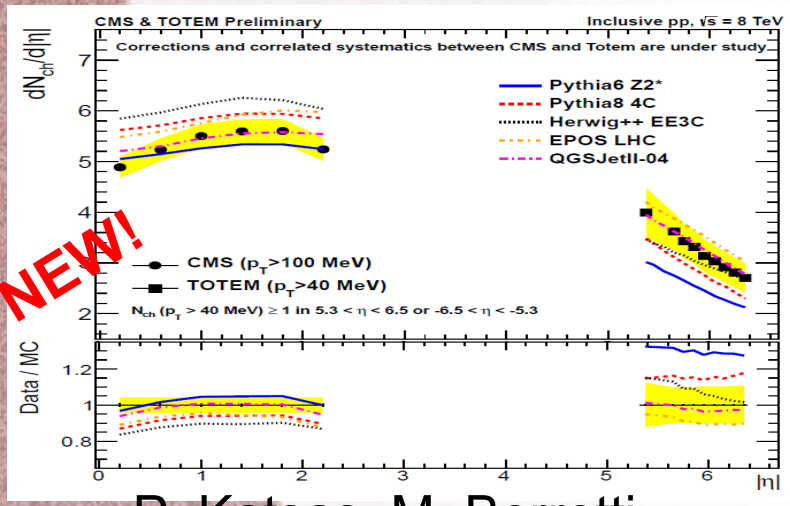
- +A number of phenomenological predictions for exclusive and hard diffractive processes in both Pb-Pb and p-p presented in this session (A. Szczurek, W. Schaefer, C. Mariotto...)

Minimum Bias, Underlying Event, and Multi-Parton Interactions

- ATLAS: studies of underlying event in inclusive/exclusive dijet events at 7 TeV
  - Use of calorimeter jets to extend coverage to $|\eta|<4.7$
  - Most models fail to describe low->high pT evolution



O. Kepka



P. Katsas, M. Berretti

- CMS+TOTEM: dN/dη at 8 TeV
- Leading track pT distributions at 8 TeV
  - Interpreted in terms of "taming" of cross section near unitarity bound set by σ_{inel} (talk by A. Grebenyuk)

Summary of the Summary

- ~15-20 experimental talks, with too many interesting presentations to cover in a 10 minute summary – c.f.:
  - Inclusive diffraction (J. Olsson) with a leading proton at HERA
  - Quarkonia production and polarisation at LHCb (M. Frosini)
  - Underlying event studies in CMS (K. Mazumdar)
  - W+jets/double parton scattering in ATLAS (M. Myska) and CMS (P. Bartalini)
- A number of new or very recent results
  - Including data from HERA, Tevatron, and all 5 LHC experiments
- Very active community of experimentalists continuing to investigate major questions of new small-x dynamics, diffractive/exclusive production at high energies, multiparton interactions in the LHC era

Extra