

THE UNIVERSITY
OF AUCKLAND

NEW ZEALAND

Te Whare Wānanga o Tāmaki Makaurau

Dijet Imbalance in 2.76 TeV PbPb Collisions in CMS

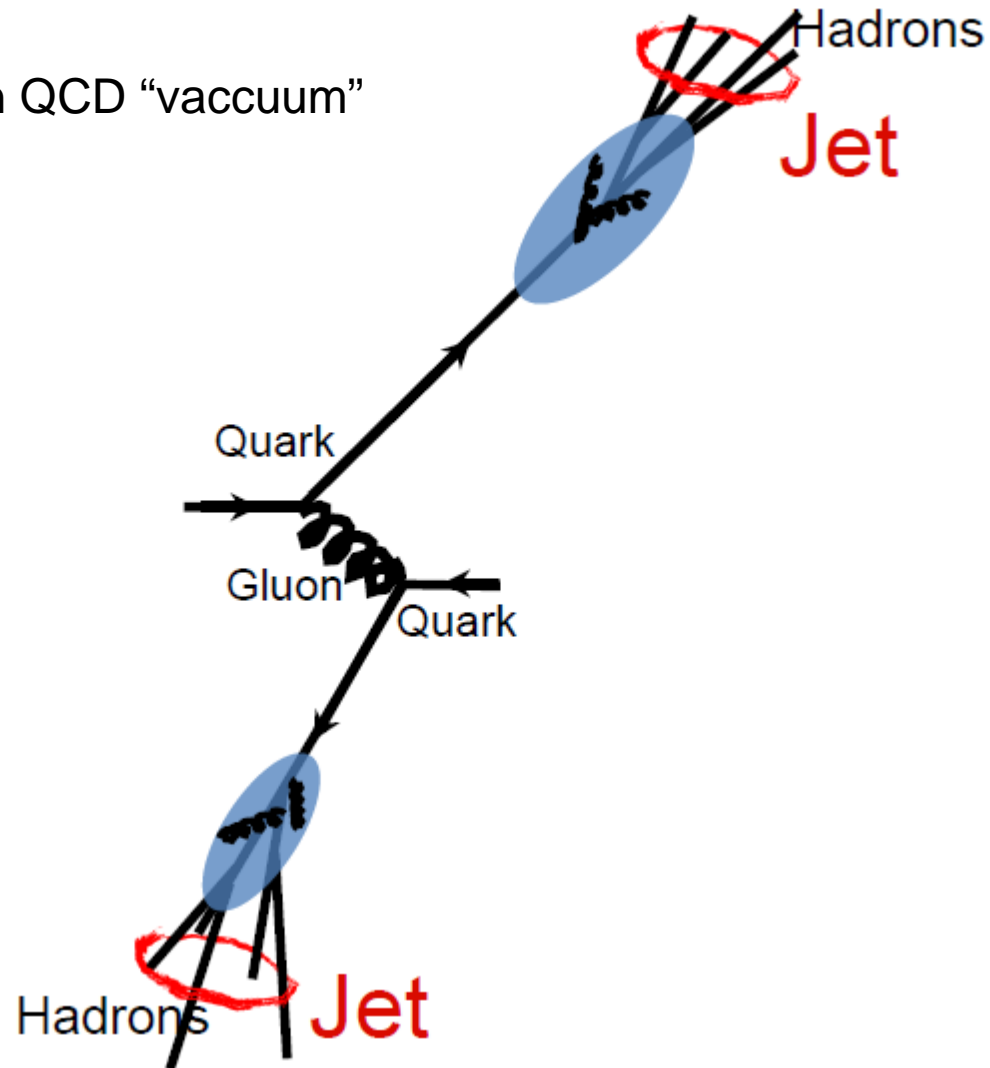
David Krofcheck

on behalf of the CMS Collaboration
ICHEP 2012, Melbourne, July 6th



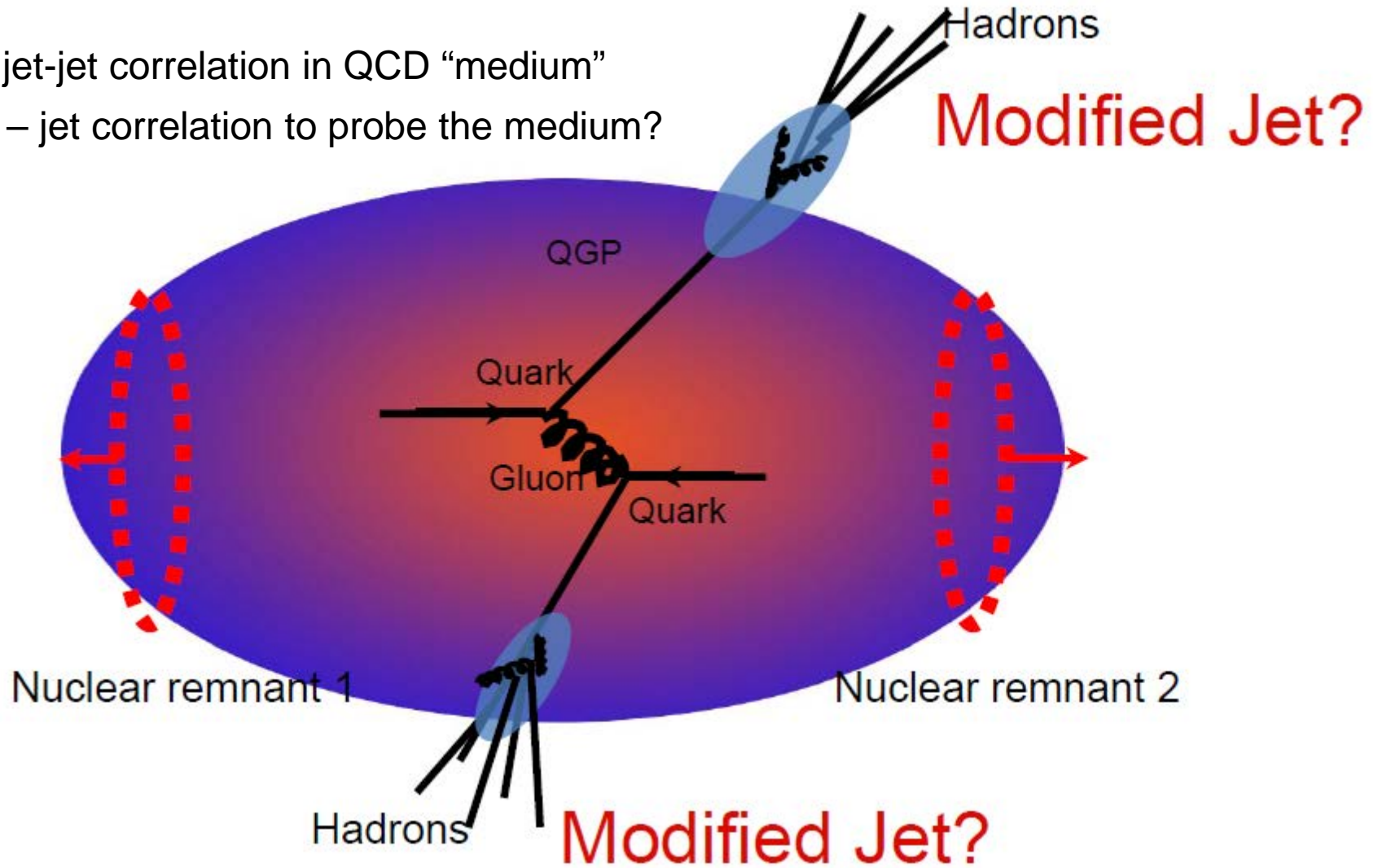
Jet production in pp collisions

jet-jet correlation in QCD “vacuum”

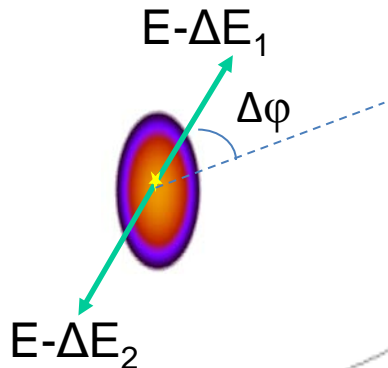


Jet production in PbPb collisions

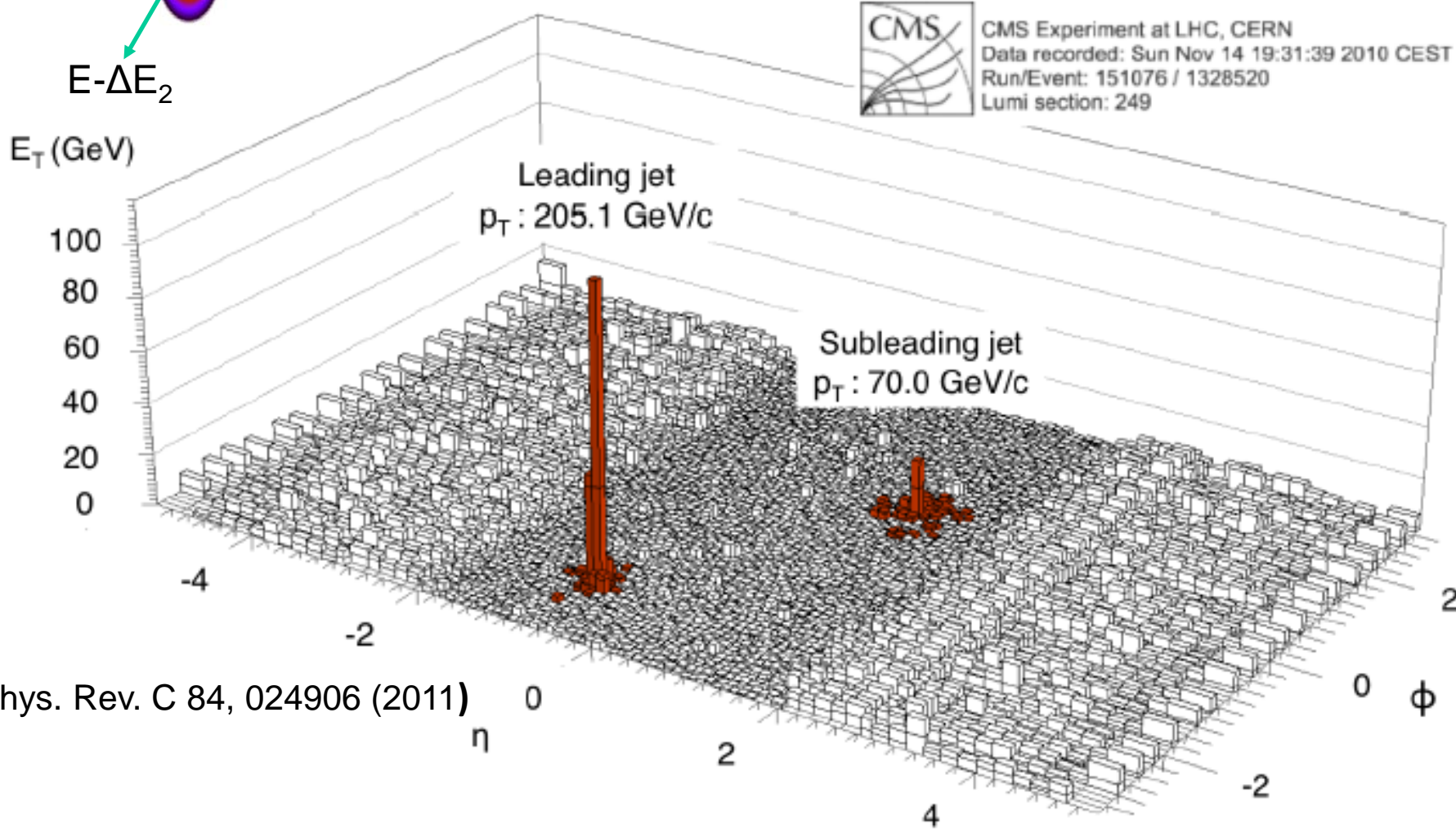
jet-jet correlation in QCD "medium"
 γ – jet correlation to probe the medium?



Dijet imbalance in PbPb collisions

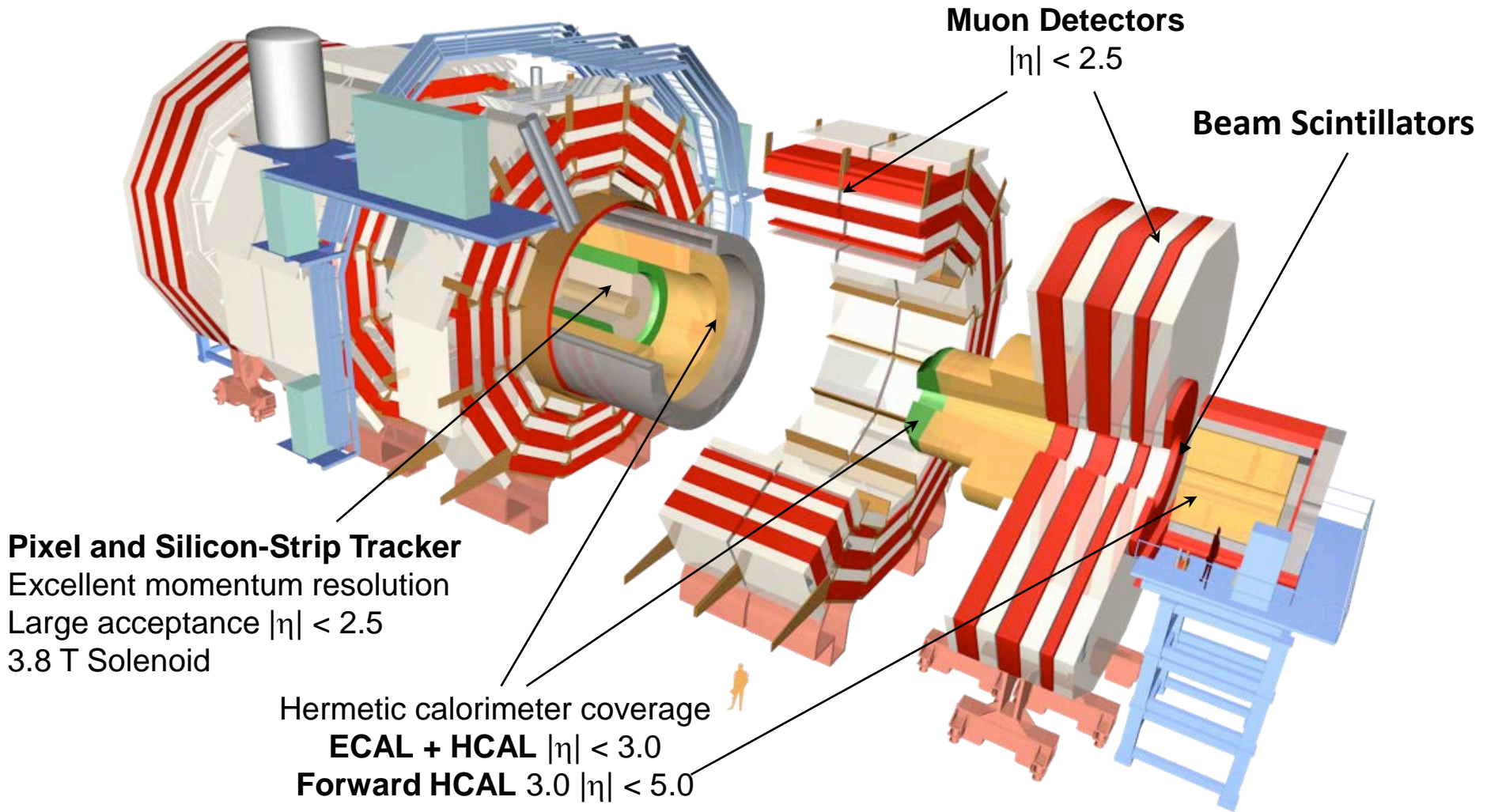


CMS Experiment at LHC, CERN
Data recorded: Sun Nov 14 19:31:39 2010 CEST
Run/Event: 151076 / 1328520
Lumi section: 249



Phys. Rev. C 84, 024906 (2011)

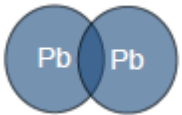
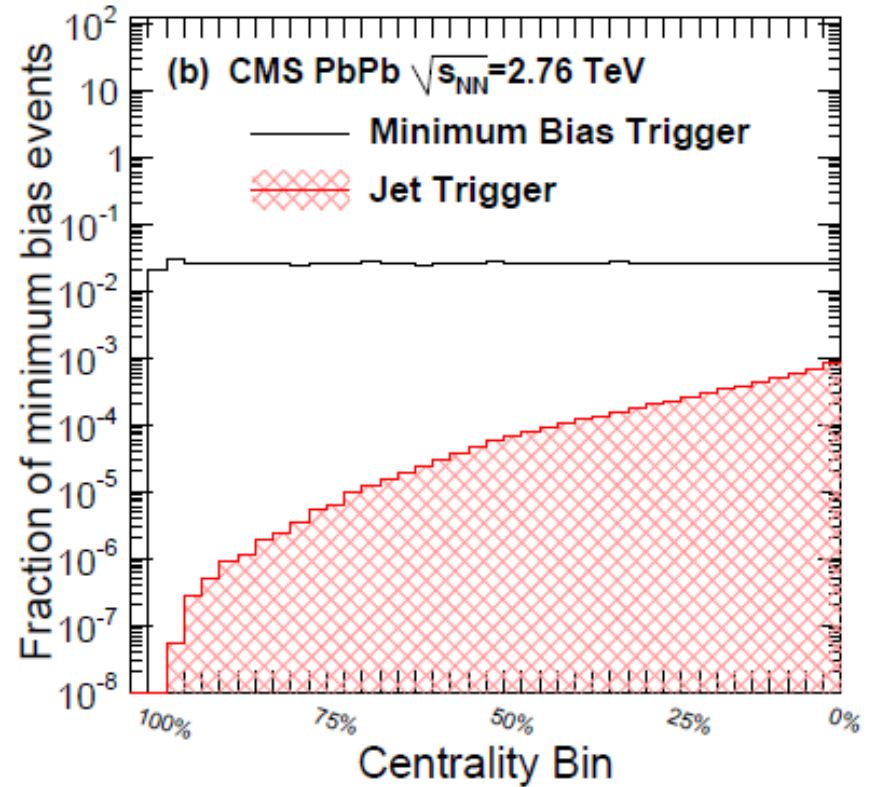
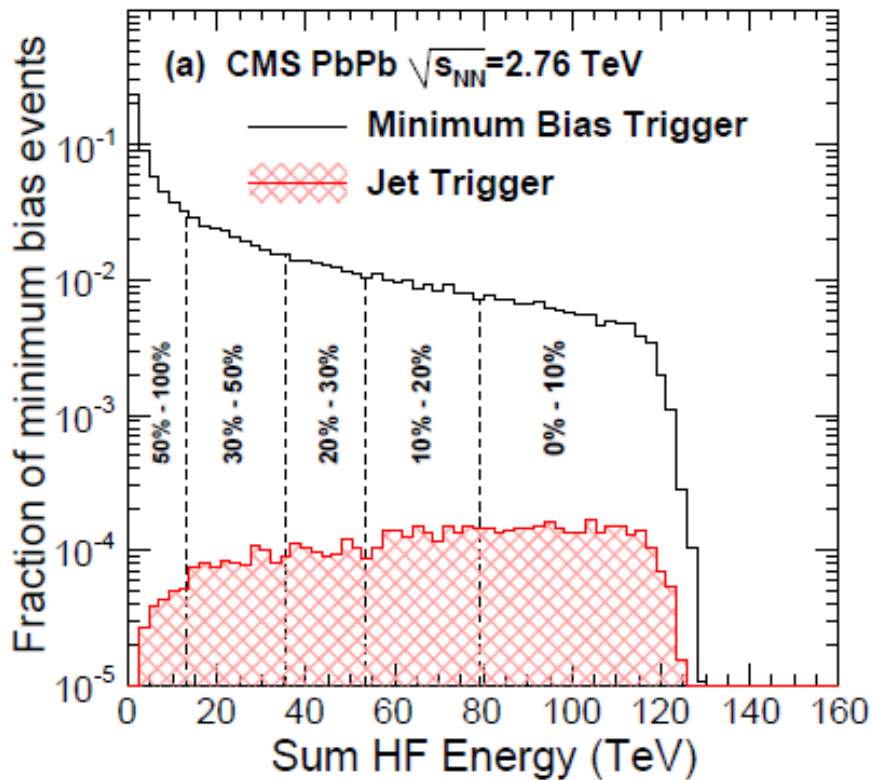
The CMS Detector



DAQ+Trigger: Dedicated triggers for Jets, Photons, Muon, high p_T charged particles, etc.

Selecting jets in PbPb collisions

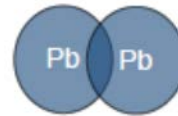
Phys. Rev. C 84, 024906 (2011)



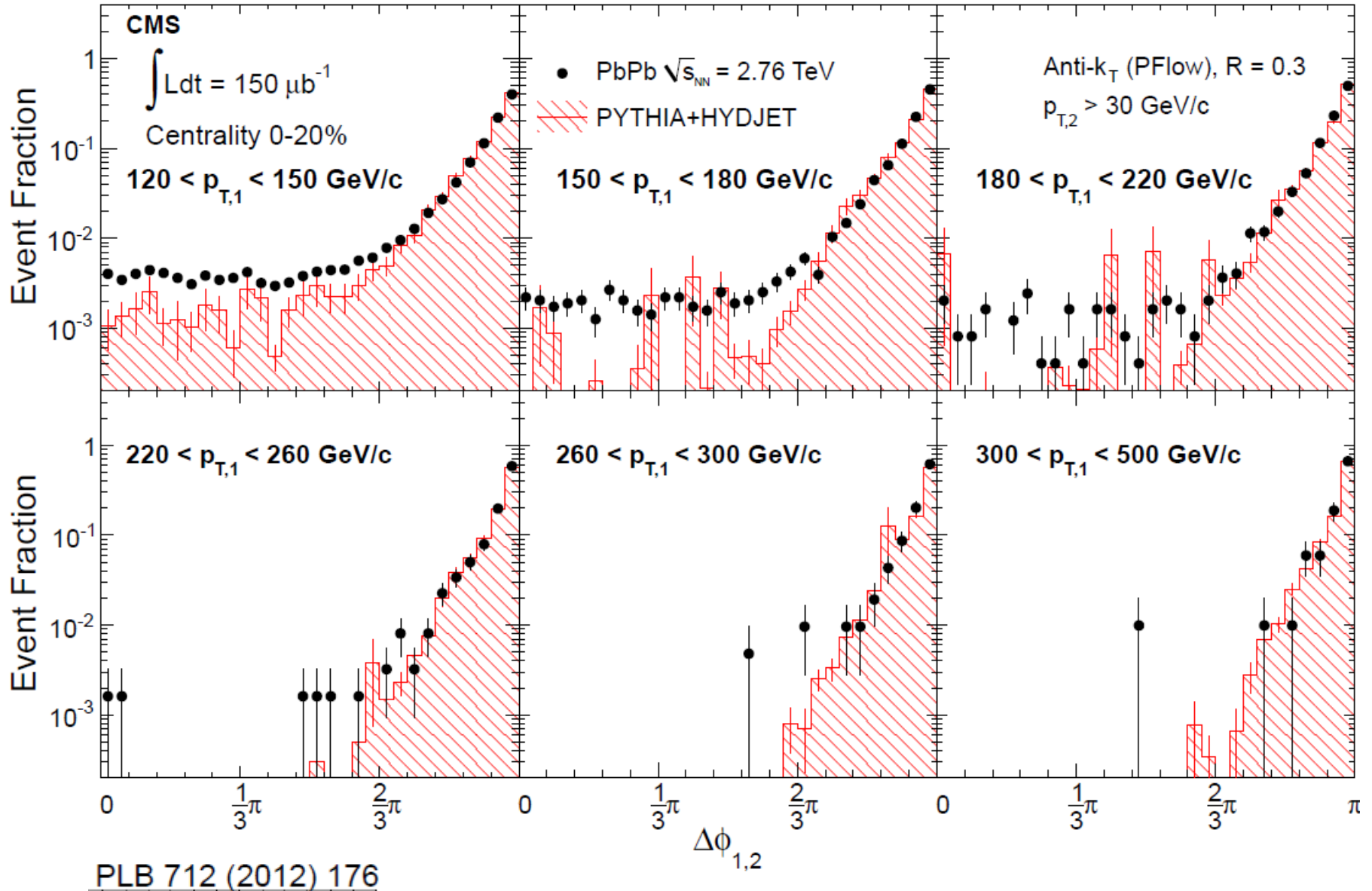
“peripheral”



“central”

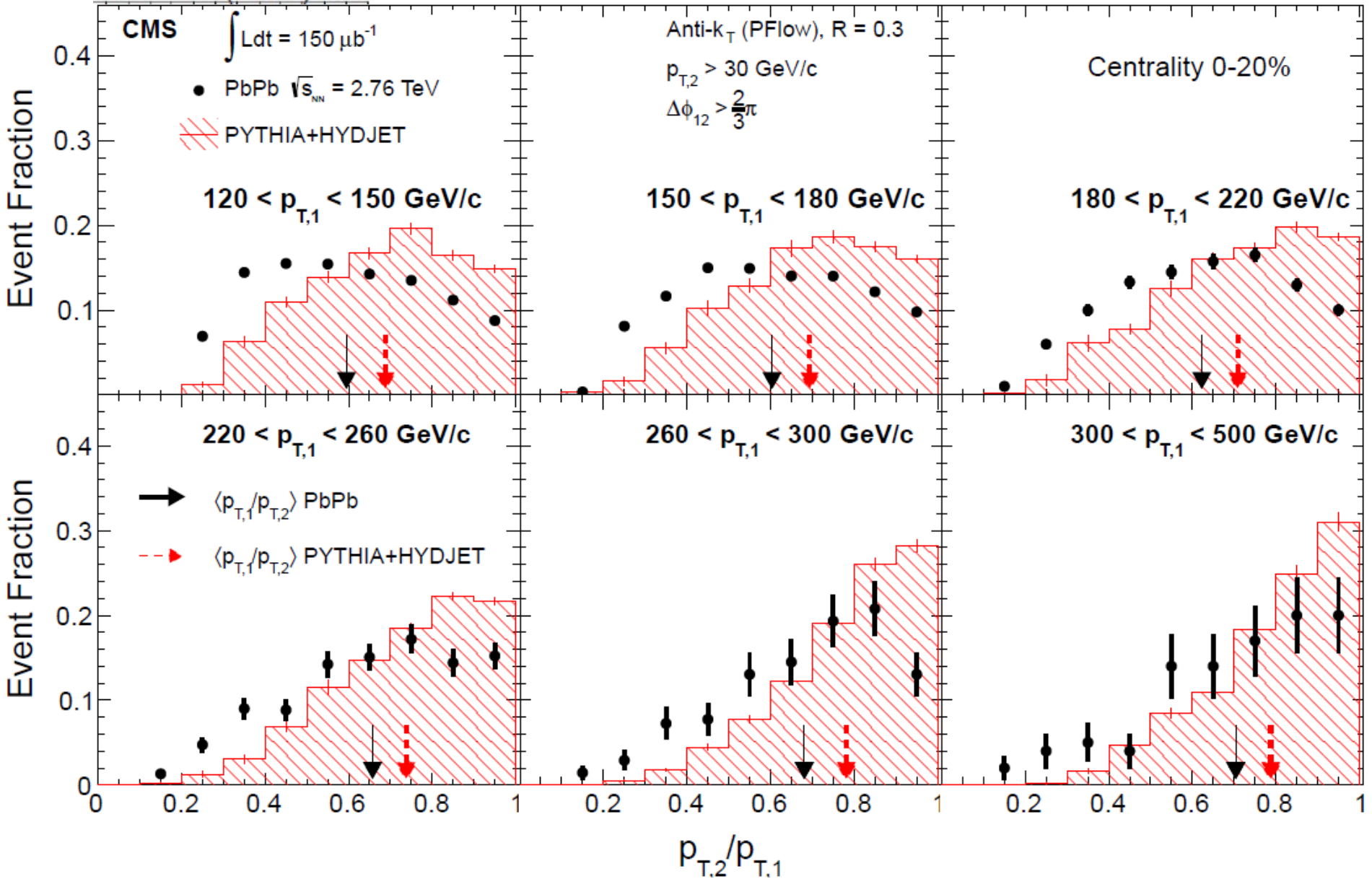


Observed angular correlation between the PbPb dijets

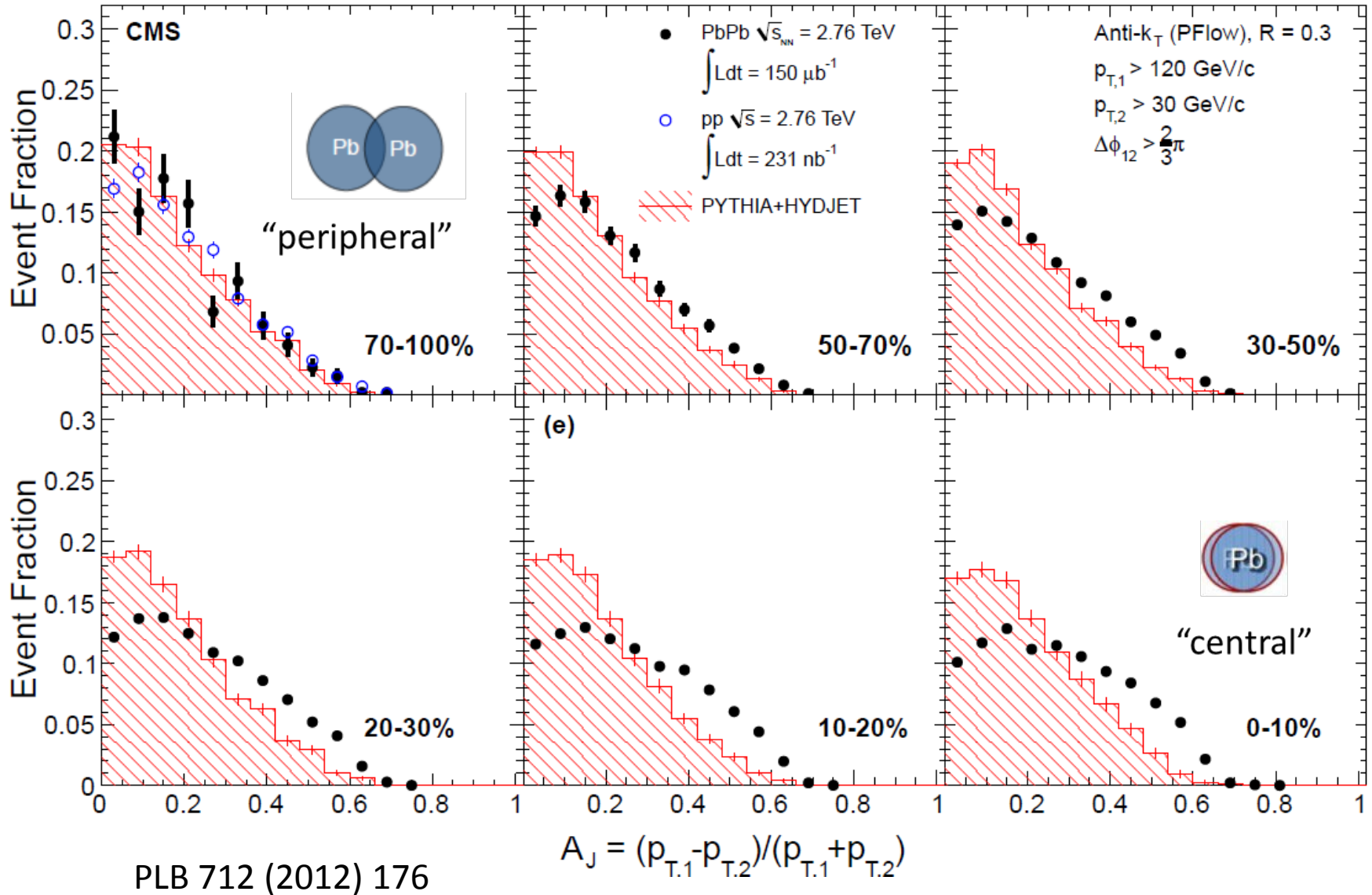


Dijets in PbPb are more imbalanced than PYTHIA+HYDJET

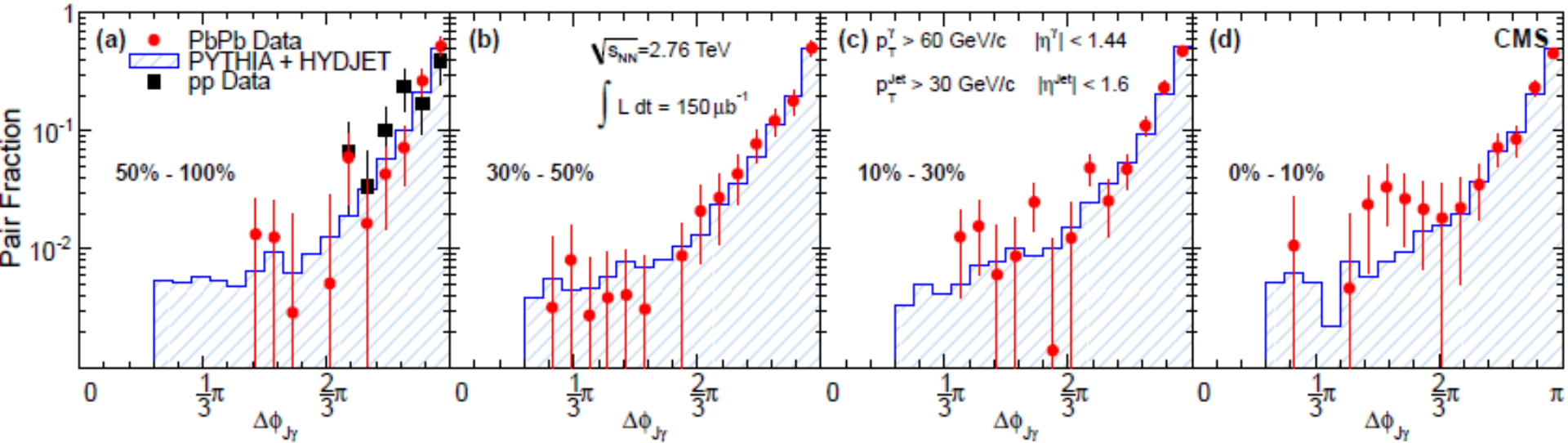
PLB 712 (2012) 176



Dijets in PbPb - asymmetry in central collisions

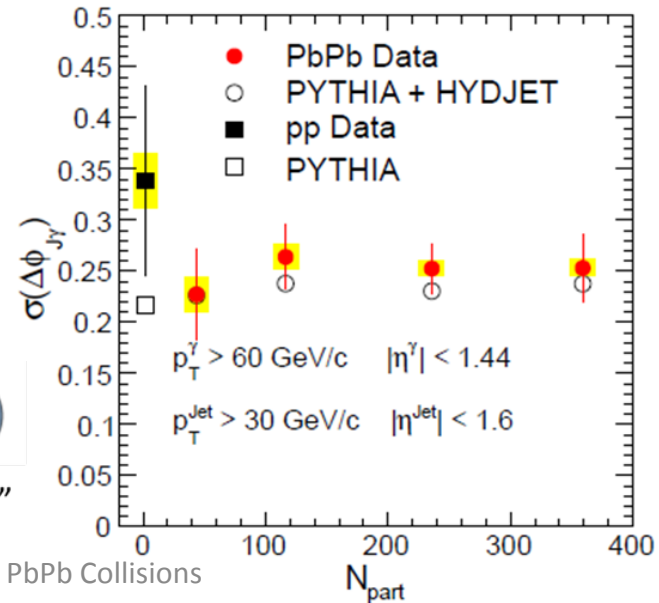
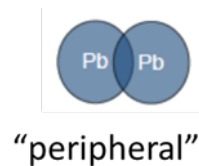


Observed angular correlation between γ – jet in PbPb collisions



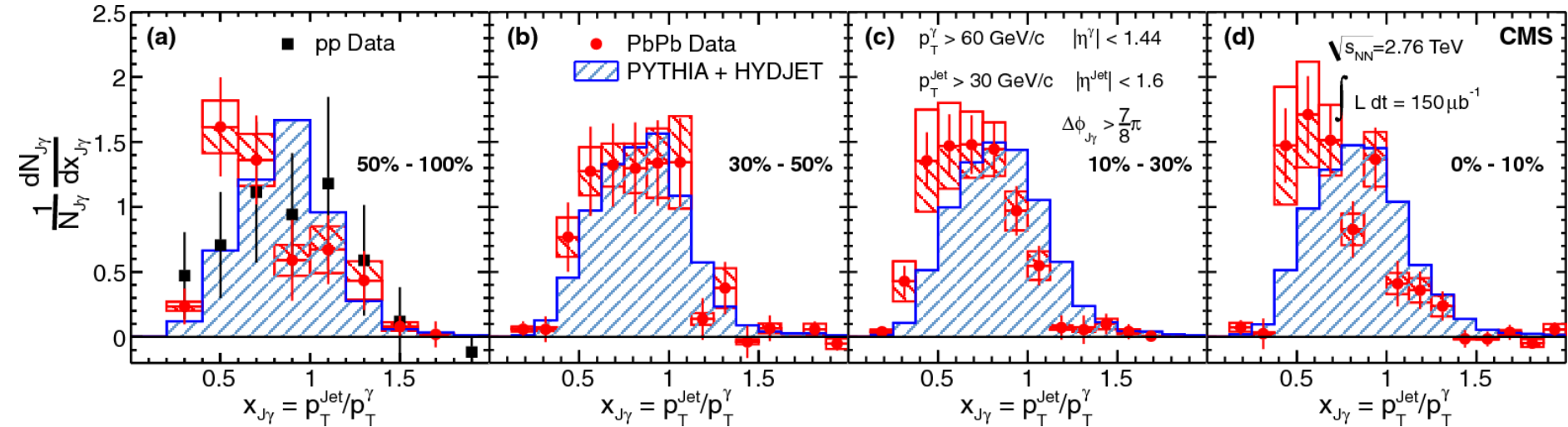
Submitted to PLB, arXiv:1205.0206

γ – jet Correlation across PbPb overlap



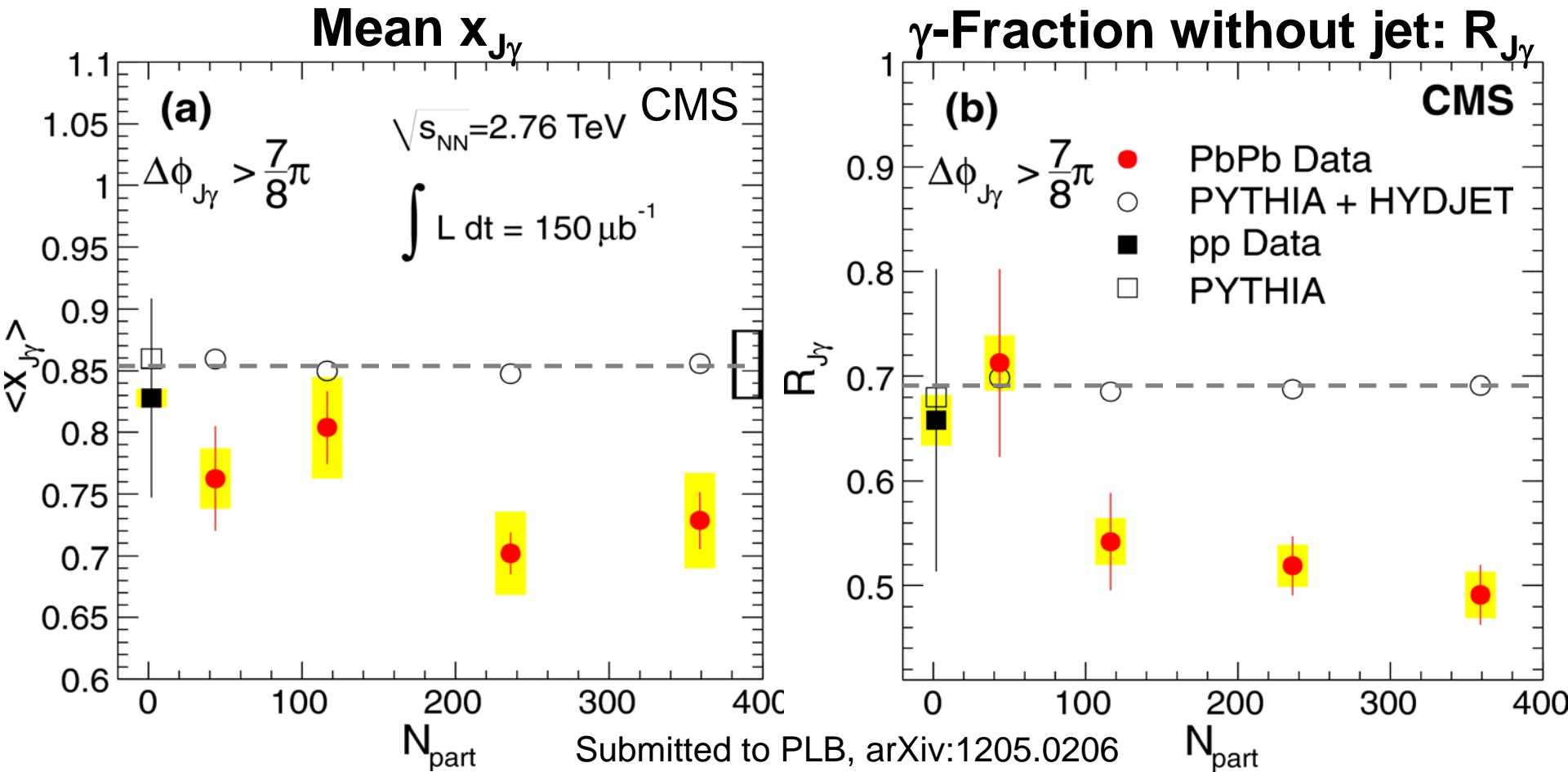
Observed momentum imbalance in γ – jet correlation

Submitted to PLB, arXiv:1205.0206



- Momentum ratio shifts/decreases with centrality
 - jets shifting below the 30 GeV p_T threshold not included

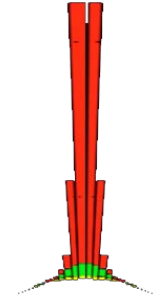
Observed deviation between γ – jet from PbPb collisions



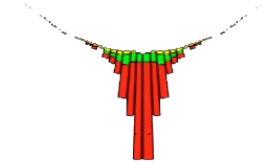
- Significant deviation of $\langle x_{J\gamma} \rangle$ in PbPb compared to PYTHIA + HYDJET
- The centrality dependence is mostly visible in $R_{J\gamma}$
 - jet p_T shifting below the 30 GeV threshold

Summary

- We used dijets to compare PbPb collisions to pp at different impact parameters and transverse momenta



- Dijets can be strongly imbalanced in momentum as a result of passing through the QCD medium



- We observe γ – jet correlations
Measuring the γ and jet energies may tell us about the energy loss mechanism of in-medium partons.

Backup slides

