Introduction

- Define goals for next LPCC Workshop
- Identify current differences between experiments
- Discuss common issues and learn where we could improve
- Review existing analyses to improve/make recommendations for next round of 8 TeV analyses or future 2015 measurements
- Combined plots? Combined measurements? Any proposals? Need to converge and have similar selection criteria
- Manpower, volunteers?

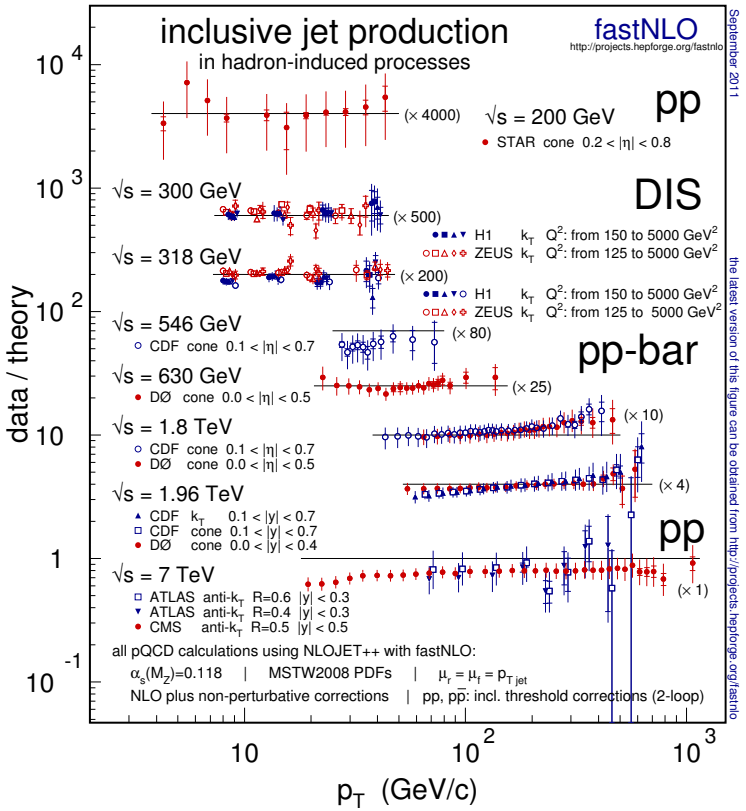
Common jet analyses

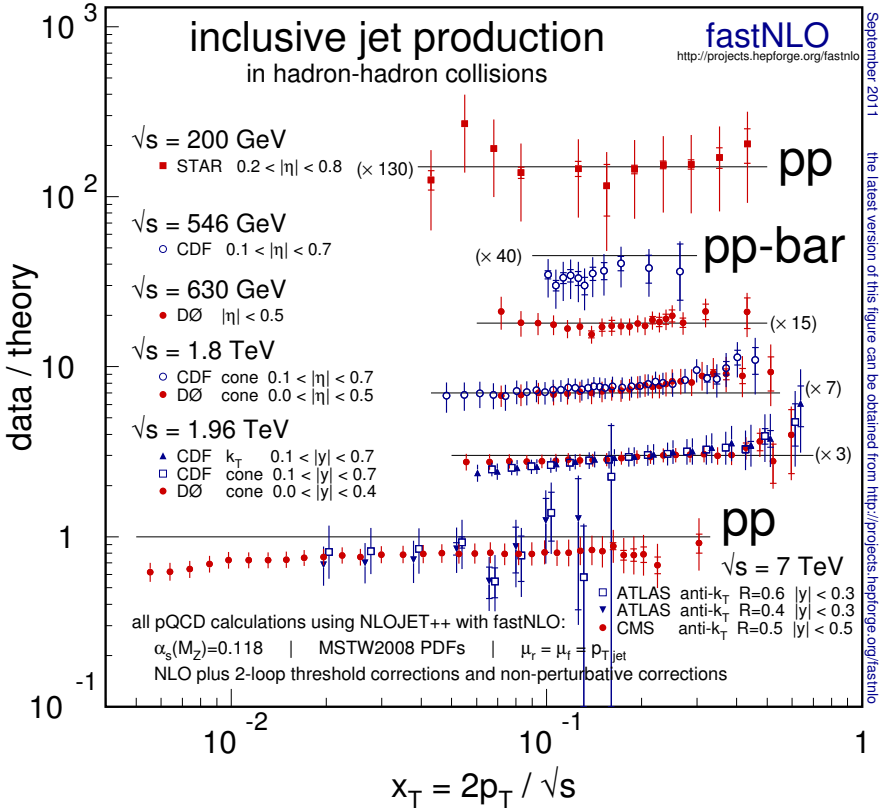
- Inclusive jet cross section measurement
  (ATLAS, PRD 86 (2012) 014022) (CMS, arXiv:1212.6660)
- Dijet cross section measurement
  (ATLAS-CONF-2012-021) (CMS, arXiv:1212.6660)
- Dijet azimuthal decorrelations
  (ATLAS, PRL 106 (2011) 172002) (PRL 106 (2011) 122003)
- b-jet cross section measurement
  (ATLAS, EPJC 71 (2011) 1846) (CMS, JHEP 04 (2012) 084)
- $b\bar{b}$ cross section measurement
  (ATLAS, EPJC 71 (2011) 1846) (CMS, JHEP 03 (2011) 136)
- α_s measurement from multijet cross section ratio
  (ATLAS-CONF-2013-041) (CMS-PAS-QCD-11-003)

Common photon analyses

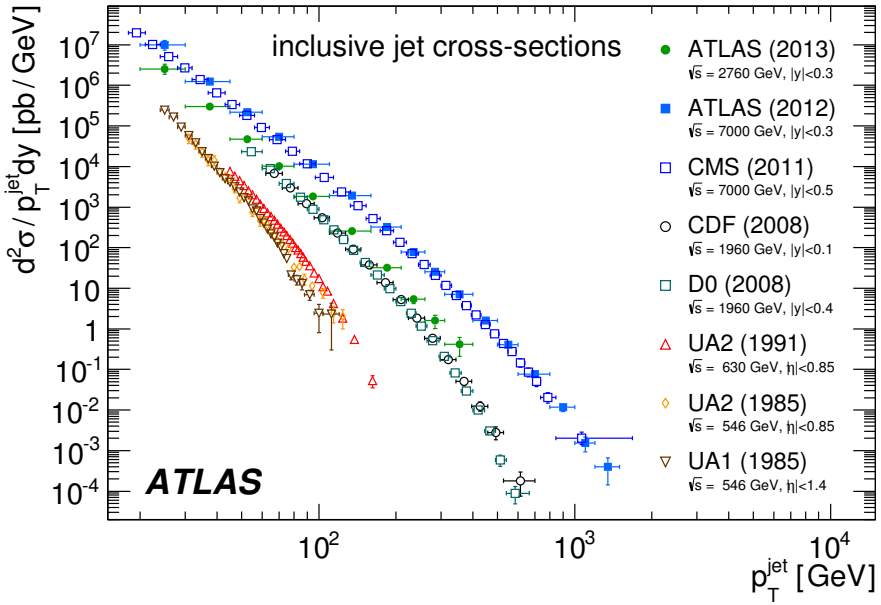
- Inclusive photon cross section measurement
  (ATLAS-CONF-2013-022) (CMS, Phys. Rev. D 84 (2011) 052011)
- Diphoton cross section measurement
  (ATLAS, JHEP 01 (2013) 086) (CMS, JHEP 01 (2012) 133)
- Photon+jets cross section measurement
  (ATLAS-CONF-2013-023) (CMS-PAS-QCD-11-005)

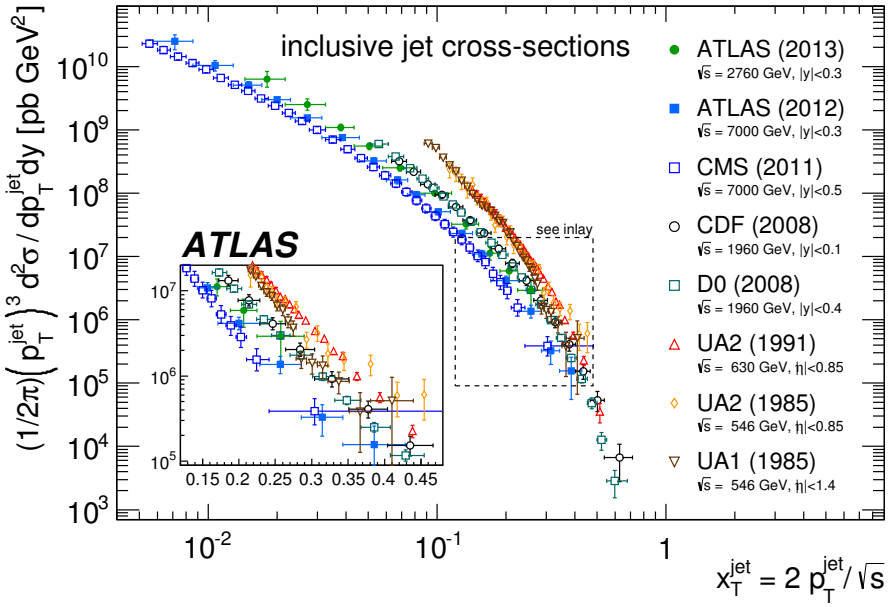
Example of combined plots (arXiv:1109.1310)





Example of combined plots (arXiv:1304.4739)





Points for discussion

- Jet cone sizes
  - ATLAS: AK4, AK6, AK10, CA12
  - CMS: AK5, AK7, CA8, CA12
- Dijet cross section observables
  - ATLAS: (m_{jj}, $y^* = |y_1 - y_2|/2$)
  - CMS: (m_{jj}, $|y|_{max} = \max(|y_1|, |y_2|)$)
  - Triple differential?
- Binning
- Unfolding
  - ATLAS: Bayesian, IDS (arXiv:1106.3107)
  - CMS: Bayesian (NIM A 362 (1995) 487)
- Experimental systematic uncertainties
- Jet substructure techniques

Points for discussion

- NLO predictions in jet cross sections
  - ATLAS: NLOJet++, POWHEG+PYTHIA, POWHEG+HERWIG
  - CMS: NLOJet++
- NLO predictions in *b*-jet cross sections
  - ATLAS: MC@NLO+HERWIG, POWHEG+PYTHIA
  - CMS: MC@NLO+HERWIG
- PDF sets (can use Theory/Data ratio if there is enough statistics)
  - ATLAS: CT10 (default), MSTW2008, NNPDF2.3, HERAPDF1.5, ABM11
  - CMS: CT10, MSTW2008, NNPDF2.1 (default), HERAPDF1.5, ABKM09
- Nonperturbative corrections
  - ATLAS: central value is taken from PYTHIA
  - CMS: central value is taken as the average of two models
- Electroweak corrections not applied (arXiv:1210.0438)

Points for discussion

- Inclusive jet cross section scale
  - ATLAS: $\mu = \mu_R = \mu_F = p_{\mathrm{T}}^{\mathrm{max}}$
  - CMS: $\mu = \mu_R = \mu_F = p_{\mathrm{T}}$
- Dijet cross section scale
  - ATLAS: $\mu = \mu_R = \mu_F = p_{\mathrm{T}} \exp(0.3y^*)$
  - CMS: $\mu = \mu_R = \mu_F = p_{\mathrm{T}}^{\mathrm{ave}}$
- b-jet cross section scale
  - ATLAS: $\mu = \mu_R = \mu_F = Q^2 = E_{\mathrm{T}}^2 = m_b^2 + p_{\mathrm{T}}^2$
  - CMS: $\mu = \mu_R = \mu_F = p_{\mathrm{T}}$
- Theoretical systematic uncertainties
  - Uncertainties on the PDFs
  - Uncertainty due to the choice of factorization and renormalization scales, envelope of $(\mu_F/\mu, \mu_R/\mu) = (0.5,0.5), (2,2), (1,0.5), (1,2), (0.5,1), (2,1)$
  - Uncertainty on the value of α_s
  - Uncertainty due to the nonperturbative correction
    - ATLAS: maximum spread of the correction factors
    - CMS: uncertainty on the average

Points for discussion

- Photon isolation
- Diphoton $\cos\theta^*$ definition:
  - ATLAS: $\cos\theta^* = 2p_{T\gamma 1}p_{T\gamma 2}\sinh(\eta_{\gamma 1} - \eta_{\gamma 2})/(m_{\gamma\gamma}m_{T\gamma\gamma})$ [Collins-Soper]
  - CMS: $|\cos\theta^*| = |\tanh\frac{\Delta y_{\gamma\gamma}}{2}|$

Meetings

- We can have monthly topical meetings starting in mid June (organize more frequent meetings if needed)
- Open discussion between ATLAS and CMS, inviting relevant people, respective analyzers, etc. $\rightarrow$ to be announced in LHC-EWWG@cern.ch
- Report outcome of the meeting to our collaborations and iterate to make a final decision
- Possible schedule:
  - **Jun - Jet discussion (cone sizes, observables, etc.)**
  - Jul - Photon discussion
  - Aug - Jet substructure discussion
  - Sep - α_s discussion
  - Oct - Next LPCC WS?