

LHC EW WG 2: Jets and EW bosons

- Conveners:
 - ATLAS: Eram Rizvi, Heberth Torres
 - CMS: Hannes Jung, Emanuela Barberis
 - LHCb: Stephen Farry, Will Barter
 - TH: Marek Schoenherr
- further reading: [WG Twiki](#)

Status of Rivet plugins: Inclusive Jets

7 TeV

Rivet Routine	Process	Data Set	Link to Routine	Routine status
CMS_2011_S9086218	Inclusive jets	7TeV 2010 34 pb-1	http://rivet.hepforge.org/analyses/CMS_2011_S9086218	public
CMS_2013_I1208923	Inclusive jets and dijets	7TeV 2011 5.0 fb-1	http://rivet.hepforge.org/analyses/CMS_2013_I1208923	public
ATLAS_2012_I1082936	Inclusive and dijets	7TeV 2010	http://rivet.hepforge.org/analyses/ATLAS_2012_I1082936	public
ATLAS_2014_I1325553	Inclusive jets	7TeV 2011	http://rivet.hepforge.org/analyses/ATLAS_2014_I1325553	public
ATLAS_2014_I1268975	Di-jets high m(jj)	7TeV 2011	http://rivet.hepforge.org/analyses/ATLAS_2014_I1268975	public
CMS_2016_I1487277	Inclusive jets and ratio to 2.76 and 7 TeV	8TeV 2012	https://www.hepforge.org/archive/rivet/contrib/CMS_2016_I1487277.tgz	public
ATLAS_xxxx_xxxx	Inclusive jets	8TeV 2012	https://arxiv.org/abs/1706.03192	in preparation
CMS_2016_I1459051	Inclusive jets	13TeV 2015	http://rivet.hepforge.org/analyses/CMS_2016_I1459051	public
ATLAS_2016_CONF_2016_092	Inclusive jets	13TeV 2015	http://rivet.hepforge.org/analyses/ATLAS_2016_CONF_2016_092	public
ATLAS_xxxx_xxxx	Inclusive jets	13TeV 2015	https://arxiv.org/abs/1711.02692	in preparation

8 TeV

13 TeV

High stat

High stat



Status of Rivet plugins: W/Z+Jets

7 TeV

Rivet Routine	Process	Data Set	Link to Routine	Routine status
CMS_2015_I1310737	Z + jets	7TeV 2015	https://rivet.hepforge.org/analyses/CMS_2015_I1310737.html	public
CMS_2014_I1303894	W + jets	7TeV 2014	https://rivet.hepforge.org/analyses/CMS_2014_I1303894.html	public
ATLAS_2013_I1230812	Z + jets	7TeV 2011	http://rivet.hepforge.org/analyses/ATLAS_2013_I1230812.html	public
ATLAS_2012_I1083318	W + jets	7TeV 2010	http://rivet.hepforge.org/analyses/ATLAS_2012_I1083318.html	public
ATLAS_2014_I1319490	W + jets	7TeV 2011	http://rivet.hepforge.org/analyses/ATLAS_2014_I1319490.html	public
LHCb_2014_I1262703	Z(->mumu)+jets	7 TeV 2011	https://rivet.hepforge.org/analyses/LHCb_2014_I1262703.html	public

8 TeV

CMS_2016_I1491953	W + jets	8TeV 2017	https://rivet.hepforge.org/analyses/CMS_2016_I1491953.html	public
CMS_xxxx_xxxxxxx	Z + jets	8TeV 2017	https://arxiv.org/abs/1611.03844	in preparation
ATLAS_xxxx_xxxxxxxxx	W(->ev) + jets	8TeV 2012	https://arxiv.org/abs/1711.03296	in preparation
LHCb_xxxx_xxxxxxxxx	W/Z(->mu(mu))+jets	8 TeV 2012	https://arxiv.org/abs/1605.00951	in preparation

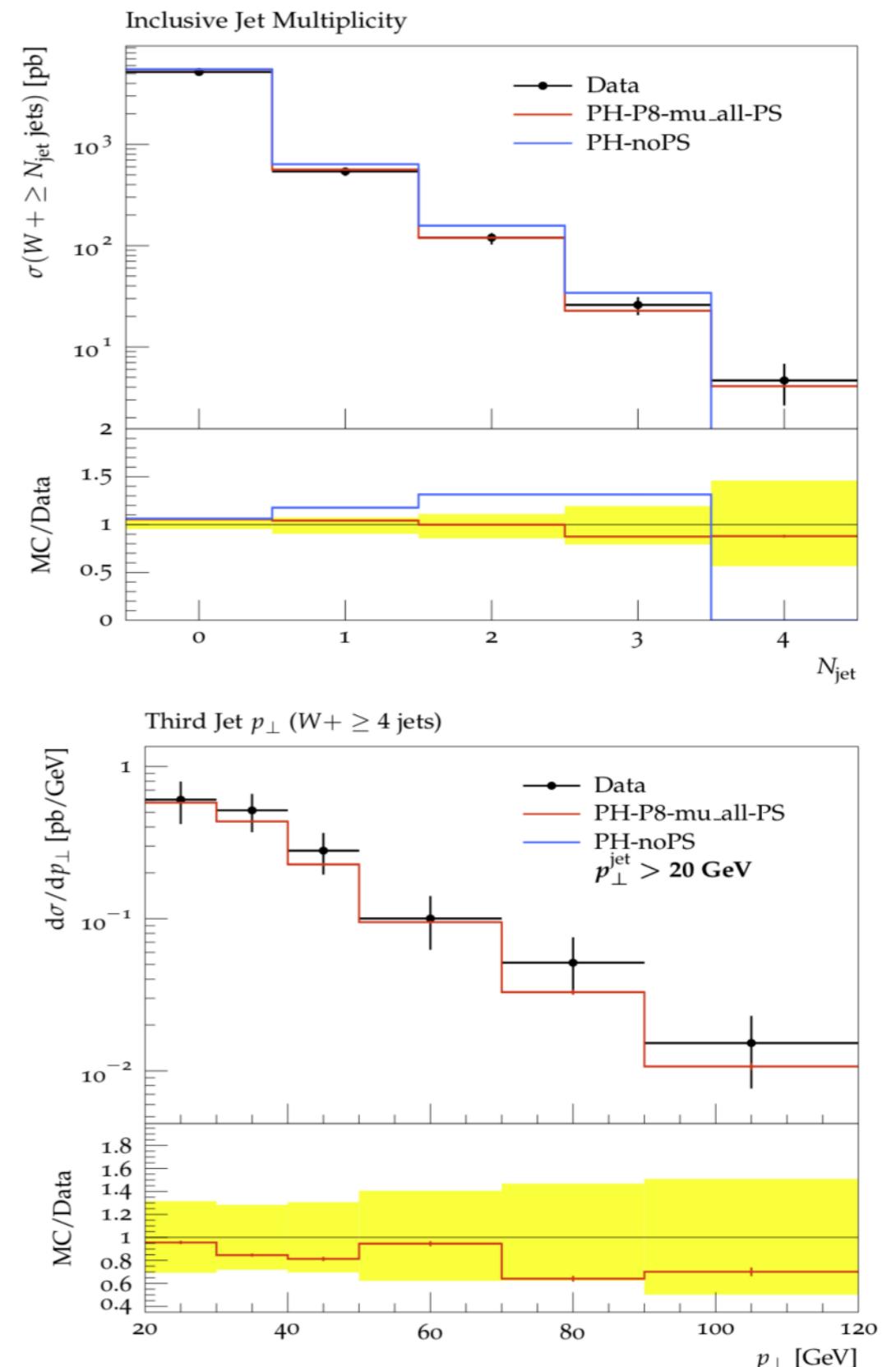
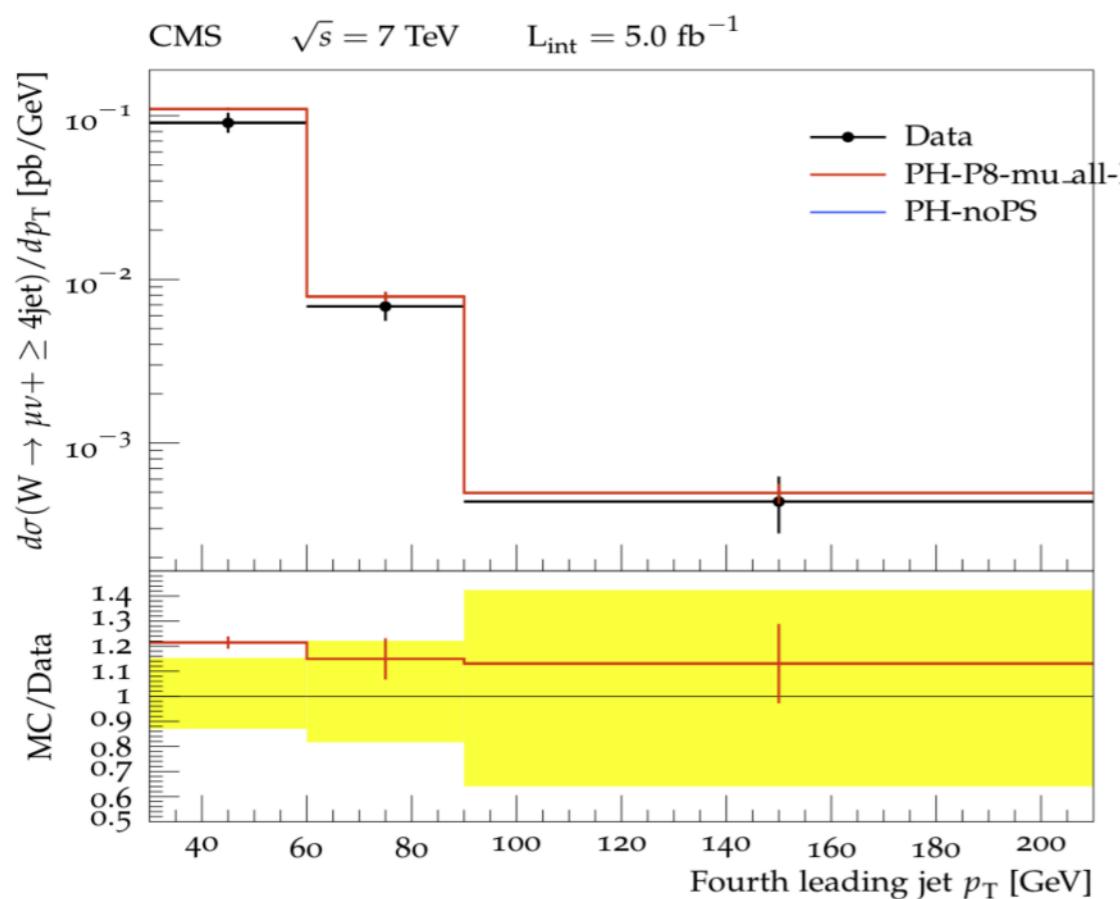
13 TeV

CMS_2017_I1610623	W + jets	13TeV 2017	https://www.hepforge.org/archive/rivet/contrib/CMS_2017_I1610623.tgz	awaiting rivet release
CMS_xxxx_xxxxxxx	Z + jets	13TeV 2018	https://arxiv.org/abs/1804.05252	in preparation
ATLAS_2017_I1514251	Z + jets	13TeV 2015	http://rivet.hepforge.org/analyses/ATLAS_2017_I1514251.html	public



Benchmark xsection at 7 TeV: PH W+2jet MiNLO

- POWHEG W+2Jet MiNLO
 - PDF: NNPDF30_nnlo_as_0118
 - steering files, yoda files on Gitlab



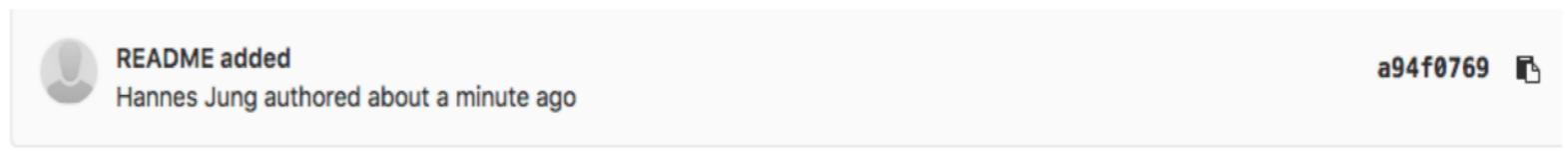
→ PH MiNLO W2jet not bad.

Benchmark x-section at 7 TeV

- Next steps:
 - Z+jets
 - Sherpa
- Need a central place to store rivet comparisons
- How to deal with large MC samples:
 - store them centrally ?
 - can we use experiment MC samples, who can run over them ?
 - would it make sense to generate and store benchmark lhe/hepmc samples centrally, also for future use and comparison
 - this could be the benchmark simulation with the LHC tune
- How to proceed with benchmark x-section:
 - need volunteers
 - how to proceed with 8 TeV

GitLab repository

- GitLab repository: [lhcekwg-vjets](#)
 - to use it, please sign on [lhcekwg](#) email list:
 - repository for all what we need in the WG
 - Store all tools for Rivet comparisons: yoda files, steering files etc
 - PH 7 TeV
 - inclusive jets, W+jet



Name	Last commit	Last update
README added Hannes Jung authored about a minute ago		a94f0769
Pythia8-powheg-V2jets.cmnd	W2jet infos for 7 TeV added	3 minutes ago
Pythia8-powheg-jets.cmnd	Pythia steering file for shower/hadronisati...	a month ago
README	First version of README file	a month ago
README-W2jet-Rivet-cmd	README added	about a minute ago
README-jet-Rivet-cmd	README-jet-Rivet-cmd added	a month ago
Wjet-powheg.input-save	W2jet infos for 7 TeV added	3 minutes ago
powheg-7TeV.input	powheg template added	a month ago
powheg-Wjet-mu-p8-cueta1-7TeV-all.yo...	W2jet infos for 7 TeV added	3 minutes ago
powheg-dijet-p8-cueta1-7TeV_merged.y...	yoda file replaced, now including high lu...	a month ago
README		

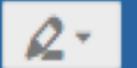
Theory comparison

- Common LHC tune for different NLO MC generators: **LHC tune**
 - Goal: provide a common benchmark tune for theory calculations
 - select data for the tune
 - select parameters to tune
 - common PDF
 - obtain PS, hadronization etc uncertainties
 - validate tune with measurements from 7 – 13 TeV
 - Time scale
 - first results during summer 2018
 - to be used for theory comparison
 - Special meeting next week, June 20: [Agenda](#)
 - PYTHIA, HERWIG, SHERPA
 - ATLAS, CMS, LHCb

Agenda for general meeting next week:

- Thursday-Friday June 21-22 EWWG meeting
 - Agenda Jets and EW bosons
 - combination of systematic uncertainties - common covariance matrices
 - covariance matrices and correlated systematic uncertainties in Rivet
 - combination of measurements
 - benchmark x-sections:
 - comparison with theory predictions
 - NLOPS (Powheg & MC@NLO, Sherpa has MC@NLO-like scheme),
 - Multijet-Merging
 - NLOPS with TMDs (resummation and initial state parton shower)
 - steps towards an LHC tune (summary of discussion)

WG 2: Agenda for today

LHC-EW WG: Jets and EW bosons 

Wednesday 13 Jun 2018, 16:00 → 18:10 Europe/Zurich
42-3-002 (CERN)

Videoconference Rooms  V_jet_conveners_meeting   

16:00	→ 16:10	Intro	⌚ 10m	
16:10	→ 16:30	Treatment of statistics correlations in inclusive jets (ATLAS) Speaker: Bogdan Malaescu (Centre National de la Recherche Scientifique (FR) & CERN)	⌚ 20m	
16:35	→ 16:55	Statistical uncertainties in inclusive jet analyses at detector level Speaker: Olaf Behnke (Deutsches Elektronen-Synchrotron (DE))	⌚ 20m	
17:00	→ 17:20	Combination of inclusive jet measurements of ATLAS and CMS Speaker: Mikko Voutilainen (Helsinki Institute of Physics (FI))  lhcewwg_jets_2018...	⌚ 20m	

Appendix

LHC EW WG 2: Jets and EW bosons

- Mandate of LHC EW WG:

- Support, compare and combine measurements probing the electroweak structure of the SM (fundamental electroweak parameters; tests of the gauge structure);
- Pursue theoretical developments in support of these measurements, and of their interpretation;
- compare and combine ancillary measurements performed in support of the EW precision measurements, and define how they constrain the theoretical uncertainties.
- Organize, compare and combine measurements of jet production; understand their implications on the strong interaction and PDFs.
- Final states:
 - Jet production (inclusive, and in association with vector boson)
 - Single vector boson production
 - Di-boson and multi-boson production

Structure of LHC EW working group

- WG1: Drell-Yan physics and Electroweak precision measurements
 - Inclusive single boson production
 - from x-sections and constraints on QCD/PDFs to measurements of electroweak parameters
- WG2: Jets and EW bosons
 - Inclusive Jets and V+jets
 - Comparison of experimental results; correlation models; ...
 - Comparison to theory; PDF interpretation
- WG3: EW multi-boson production
 - x-section measurements and comparison with theory
 - BSM interpretation: aGC's, EFT, ...

Mandate for WG2: Jets and EW bosons: experiment

- Goal: common measurements
 - define common binning in y and p_T (for inclusive jets, V+jets etc)
 - goal: direct comparison of jet measurements
 - combine/compare inclusive jet and V+jet measurements (same binning, same procedure)
 - flavor tagged x-sections: HQ inclusive jet and V+HQ
- Corrections, uncertainties, unfolding
 - unfolding and evaluation/propagation for uncertainties, following discussions in other forum (stat and pdf)
 - common way of correlation matrices and set of sources
 - correlated uncertainties in inclusive jets, V+jets, HQ etc
 - define consistently NP - and parton shower corrections & uncertainties
- Discussion on data combination:
 - discussion/understanding of correlated uncertainties between experiments

Mandate for WG2: Jets and EW bosons: theory

- Calculations:
 - consistent and complete QCD+EWK calculation for inclusive jet and V+jets
 - use of multi-jet + merged/matched PS predictions as compared to fixed-order times NP?
 - factorization of EWK correction
 - role of vector-bosons in pdfs at the TEV scale
- Theory uncertainties:
 - scale choice for inclusive jets, V+jets
 - other uncertainties ?
- Special topics:
 - survey of $pT(V)$ ($V=W/Z$) at low pT for QCD resummation
 - impact of precision NNLO QCD + NLO EW for dijet measurements beyond PDF determination
 - cross sections and uncertainties for $pT(V)$ ($V=W/Z/\gamma$) (for large pT) and their ratios at NNLO QCD + NLO EW at fixed order and using PS matched calculations

WG 2: Jets and EW bosons

- Goals:
 - common measurements – LHC x-sections
 - proper QCD and EW interpretation of precision measurements
- Next meetings: Friday, same time, end of May and middle June ?
 - complete set of Rivet comparisons, Jets and V+jets
 - steps to compare directly data – extrapolation to same phase space
 - proposals for common cov matrices in hepdata for use in Rivet/xFitter
 - and ?
- Preparation for next general EWWG meeting: June 21-22 2018 CERN

WG 2: Jets and EW bosons

- Further infos:
 - General [Kick-off meeting](#) 13-14. Dec 2017
 - Jets and EW bosons Twiki
 - Please subscribe to [Email list](#)