

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

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

7 TeV

High stat

High stat

8 TeV



13 TeV



Status of Rivet plugins: W/Z+Jets

7 TeV

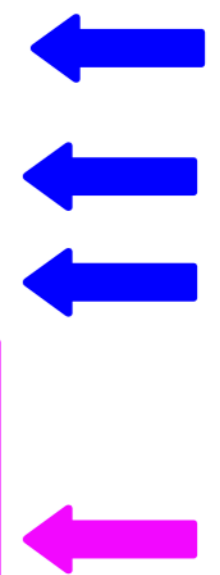
Rivet Routine	Process	Data Set	Link to Routine	Routine status
CMS_2015_I1310737	Z + jets	7TeV 2015	https://rivet.hepforge.org/analyses/CMS_2015_I1310737.html	public
CMS_2014_I1303894	W + jets	7TeV 2014	https://rivet.hepforge.org/analyses/CMS_2014_I1303894.html	public
ATLAS_2013_I1230812	Z + jets	7TeV 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	public
ATLAS_2014_I1319490	W + jets	7TeV 2011	http://rivet.hepforge.org/analyses/ATLAS_2014_I1319490	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_XXXXXXXX	Z + jets	8TeV 2017	https://arxiv.org/abs/1611.03844	in preparation
ATLAS_XXXX_XXXXXXXX	W(->ev) + jets	8TeV 2012	https://arxiv.org/abs/1711.03296	in preparation
LHCB_XXXX_XXXXXXXX	W/Z(->mu(mu))+jets	8 TeV 2012	https://arxiv.org/abs/1605.00951	in preparation

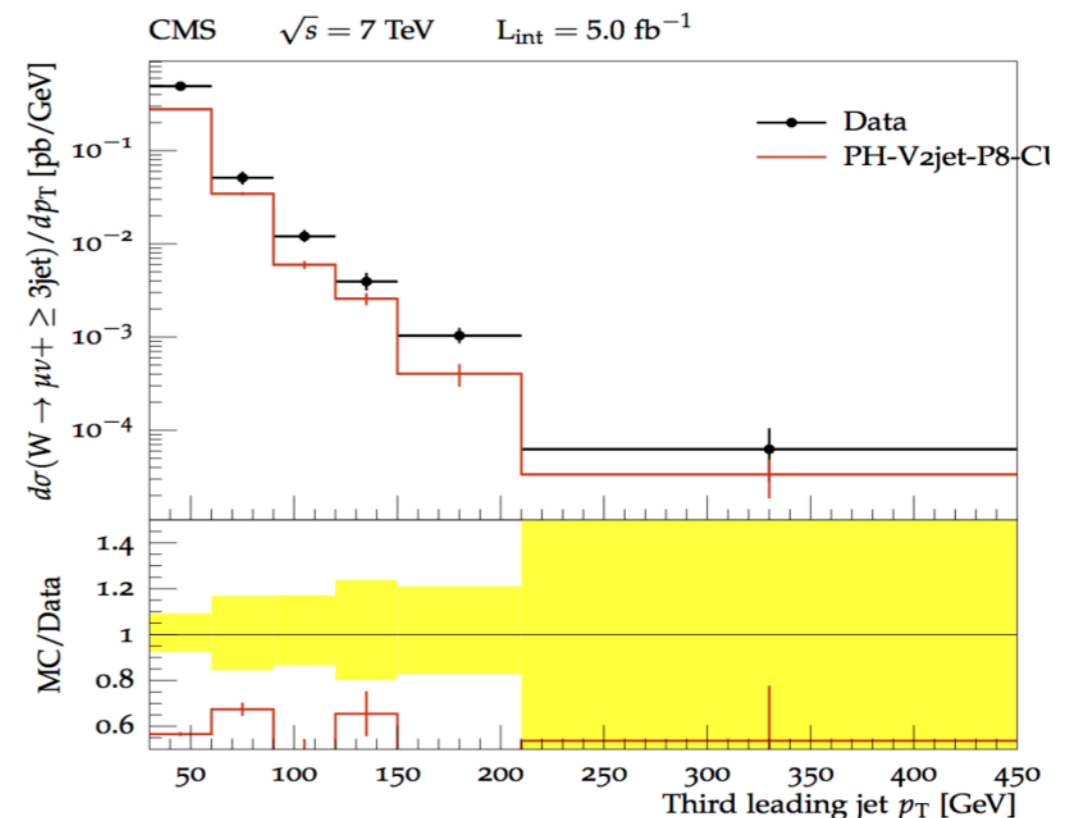
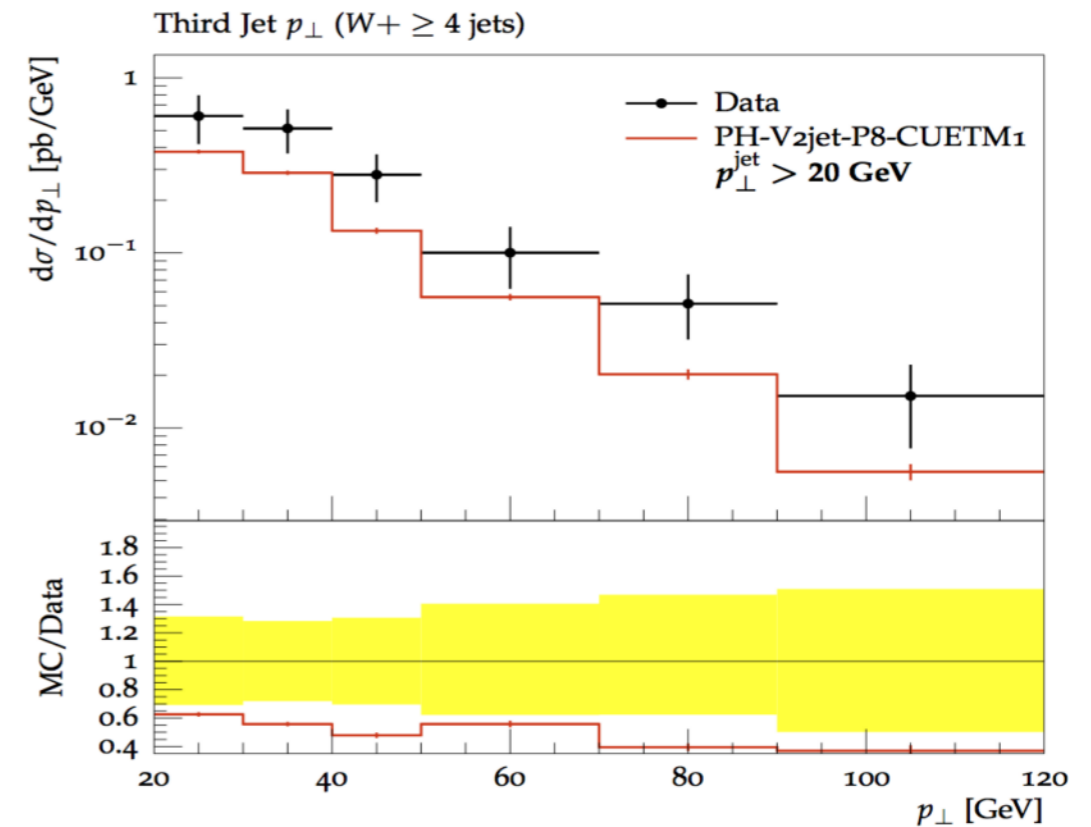
13 TeV

CMS_2017_I1610623	W + jets	13TeV 2017	https://www.hepforge.org/archive/rivet/contrib/CMS_2017_I1610623.tgz	awaiting rivet release
CMS_XXXX_XXXXXXXX	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	public



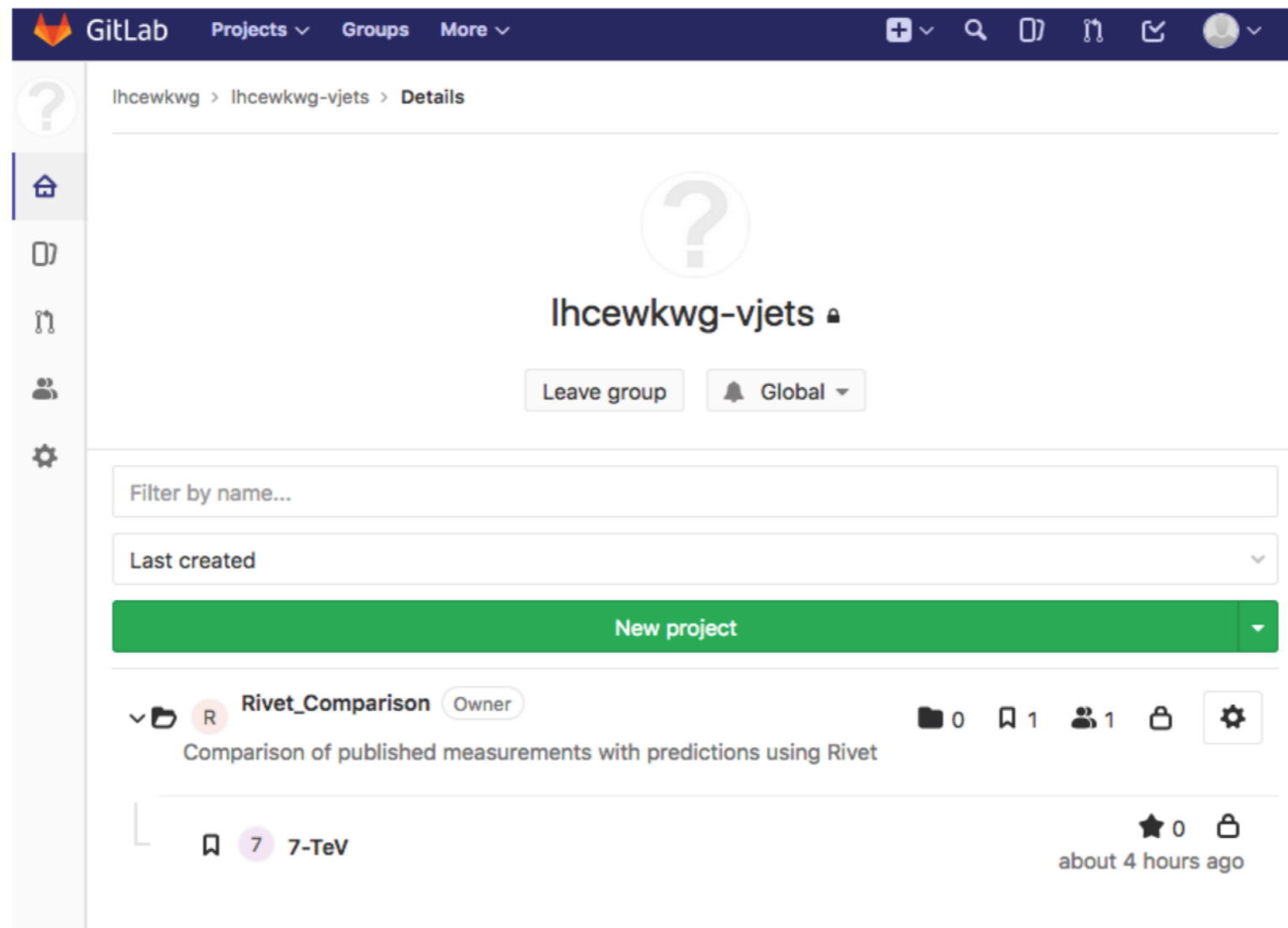
W+jet at 7 TeV: PH W+2jet MiNLO

- POWHEG W+2Jet MiNLO
 - PDF: NNPDF30_nnlo_as_0118
 - here: only W^-
 - other charge needs to be done
- Next steps:
 - Z+jets
 - compare with Sherpa ?
 - compare with MC files from experiments
 - agree on common PDF set and common tune → LHCEW tune ?



GitLab repository

- GitLab repository: [lhcewkwg-vjets](#)
 - repository for all what we need in the WG
 - Store all tools for Rivet comparisons: yoda files, steering files etc



Theory comparison


- Common LHC tune for different NLO MC generators: ***LHCEW tune***
 - Goal: provide a common benchmark tune for theory calculations
 - select data for the tune
 - select parameters to tune
 - common PDF
 - obtain PS, harmonization etc uncertainties
 - validate tune with measurements from 7 – 13 TeV
 - Time scale
 - first results during summer 2018
 - to be used for theory comparison
 - Interested persons ?

Next meetings - proposals


- Proposal:
 - Friday June 8, 15-17 Geneva time
 - Rivet comparisons for 7, 8 TeV
 - including standalone runs and running over MC files from experiments
 - proposals for common covariance matrices
 - Friday June 15, 15-17 Geneva time
 - discussion on common LHCEW tunes
 - Thursday-Friday June 21-22 EWWG meeting

WG 2: Agenda for today

LHC-EW WG: Jets and EW bosons

 Wednesday 16 May 2018, 16:00 → 18:10 Europe/Zurich

Videoconference
Rooms

 V_jet_convenerers_meeting

16:00 → 16:10 **Intro**

16:15 → 16:30 **Covariance matrix definition: CMS**
Speaker: Paolo Gunnellini (University of Hamburg)

16:35 → 16:50 **Covariance matrix definition: LHCb**
Speaker: Stephen Farry (University of Liverpool (GB))

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 $p_T(V)$ ($V=W/Z$) at low p_T for QCD resummation
 - impact of precision NNLO QCD + NLO EW for dijet measurements beyond PDF determination
 - cross sections and uncertainties for $p_T(V)$ ($V=W/Z/\gamma$) (for large p_T) 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](#)