



universität
wien

MPI, Colour Reconnection and Hadronization Effects in CJV

Simon Plätzer

Particle Physics, University of Vienna

at the
VBSCAN Mid-Term Scientific Meeting
Istanbul | 3 July 2019



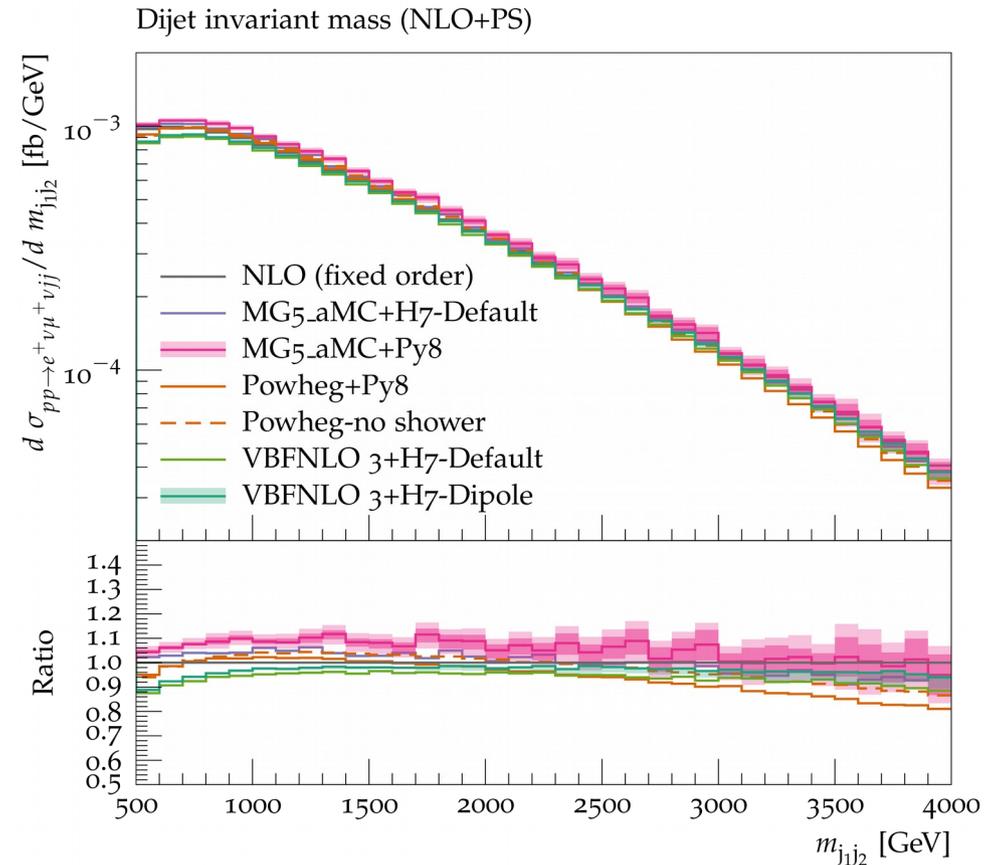
Partonic predictions now well understood at NLO+PS.

Realistic predictions need to include

- Multi-parton interactions
- Colour reconnection
- Hadronization

Far from first-principles assignment of uncertainties, so need to rely on different models/tunes.

Central jet vetoes, and more inclusive jets at **hadron colliders** especially sensitive to these effects.



Gather experts on **jet vetoes, MPI, event generators and experimentalists** to discuss soft QCD effects in VBF/VBS and to identify cornerstones of a study evaluating how reliable current predictions/models are.

In-depth discussions on handling of colour flows, colour evolution and its role within the VBF approximation, colour reconnection, impact of QCD corrections, ...

<https://indico.cern.ch/event/806009/>

Core group:

- Carsten Bittrich
- Jeff Forshaw
- Patrick Kirchgaesser
- Andreas Papaefstathiou
- Juergen Reuter
- Richard Ruiz
- Stefanie Todt
- Dieter Zeppenfeld

MPI, Colour Reconnection and Hadronization Effects in CJV

25-29 March 2019
Fakultät für Physik, Universität Wien
Europe/Zurich timezone

Overview

- Timetable
- Registration
- Participant List
- Videoconference Rooms
- COST reimbursement
- Venue

Contact

✉ simon.plaetzer@univie.a...

This workshop will focus on effects of Multi-Parton Interactions, colour reconnection and hadronization on the Central Jet Veto in VBS and VBF processes. The goal of the workshop is to kick-off a comprehensive study, comparing different models with the goal of quantifying uncertainties within typical VBS and VBF selections.



universität
wien



 **cost**
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

Soft QCD effects are not absent: **on/off will only hint at their relative importance.**

Tasks of the study

- Quantify where we see a large impact (and how certain this is)
- Quantify how reliable the predictions are, where significant
- Determine impact of parton shower variations, and interplay with models
- Pinpoint signs of lack of perturbative dynamics beyond current NLO+PS

Benchmark

- VBF Z production, plus QCD induced background if possible
- Ideally at NLO+PS for reliable modeling of hard jet activity

Observables

- Large variety of third jet properties, jet vetoes, tag-jet definitions
- Jet radius and VBF cut bin dependence

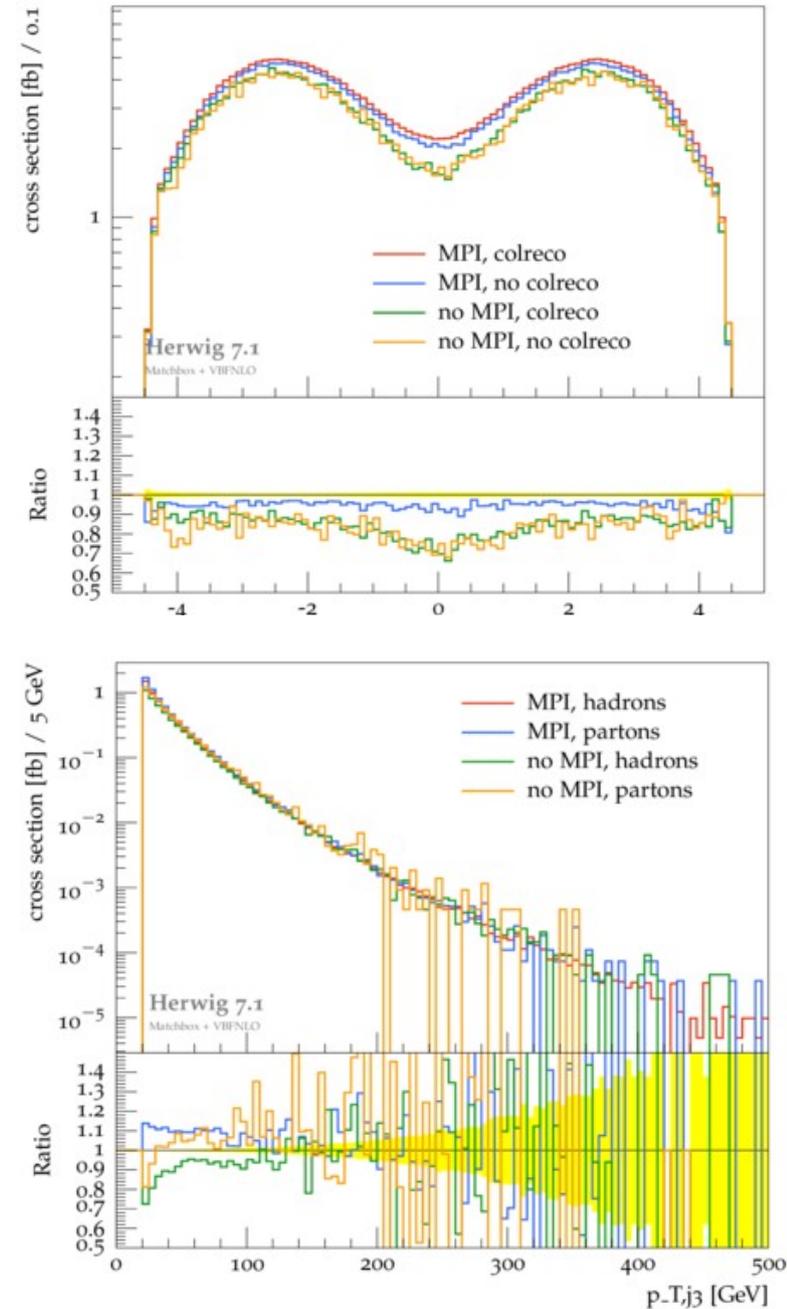
Technicalities solved

- Project repository in place
- Rivet analysis working, looking at first results
- Contributing generators (ideally NLO+PS):
Herwig 7, Pythia 8 (fed by MG5_aMC), Sherpa 2

Open questions

- Scale choice – not explored, including shower
→ currently pragmatic choice of HT'
- No tune for Pythia 8 dipole recoil (yet?)
→ in contact Pythia experts (Ilkka Helenius)
- Constrain model parameter variations
→ in progress

Goal is a paper still this year.



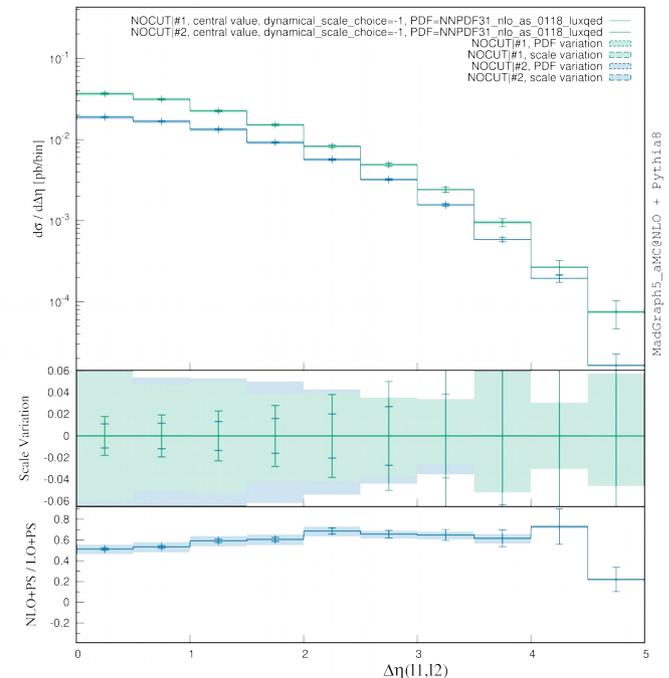
Technicalities solved

- Project repository in place
- Rivet analysis working, looking at first results
- Contributing generators (ideally NLO+PS):
Herwig 7, Pythia 8 (fed by MG5_aMC), Sherpa 2

Open questions

- Scale choice – not explored, including shower
→ currently pragmatic choice of HT'
- No tune for Pythia 8 dipole recoil (yet?)
→ in contact Pythia experts (Ilkka Helenius)
- Constrain model parameter variations
→ in progress

Goal is a paper still this year.



MG5_aMC + Pythia 8
VBS WZ with dipole recoil

In view of perturbative accuracy and understanding, soft physics needs to be quantified for an overall and reliable assessment of event generator predictions.

Work on this has started, aiming at a comprehensive study and a paper later this year: everyone is welcome to join and contribute!

COST funded workshop not only helped kick-starting this, but was also a unique opportunity for experts to get in touch on various interesting aspects of the topic.

Overlap with Les Houches activities to be determined – cf Vitaliano's talk

Please get in touch with me if interested: simon.plaetzer@univie.ac.at

Thank you!