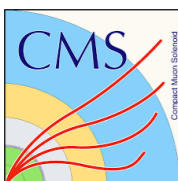


Status of the Yellow Report of the Jets & EW Bosons Subgroup

LHC EW WG General Meeting, Oct. 2020



Eram Rizvi and Benjamin Nachman



Vieri Candelise, Mikko Voutilainen, Hannes Jung ^{NEW}



Stephen Farry and Will Barter



ALICE

James Mulligan and Nima Zardoshti ^{NEW} ^{NEW}

THEORY

Marek Schoenherr

Our group, at a glance



We meet on Mondays at 4:30 PM CERN



<https://indico.cern.ch/category/3290/>



<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/EWWG2>

Today:

- Mini workshop highlights
- Benchmark comparisons + HepData status
- Intrinsic k_T tunes
- Jet substructure status
- Yellow Report

We have hosted coordinated talks over multiple weeks on a given topic for cross-experiment / theory discussion.

2020:

Collective effects in pp: Feb. 2020

ALICE and theory

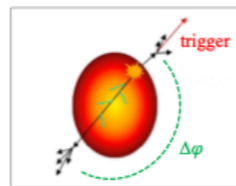
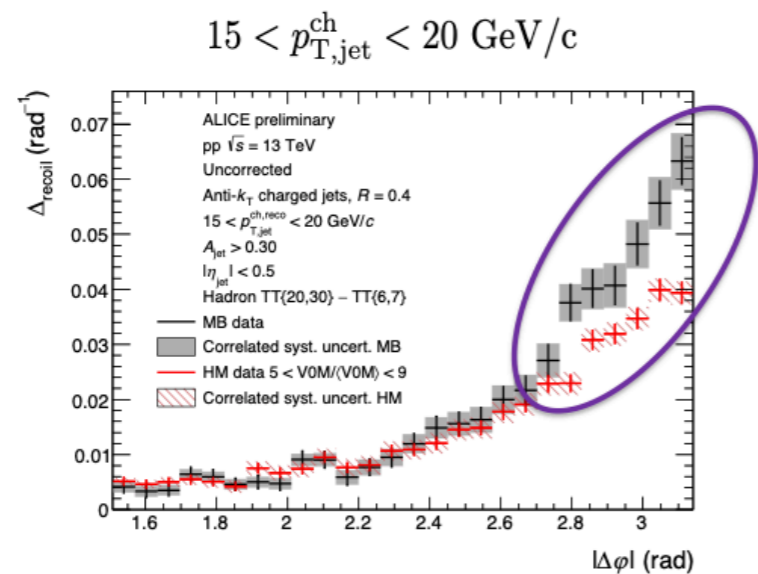
V+heavy flavor: March/April 2020

ATLAS, CMS, LHCb, PDFs, TMDs, 4/5 flavor

Jet substructure: Oct./Nov. 2020

ATLAS, CMS, LHCb, ALICE, theory

Miniworkshops - brief highlights



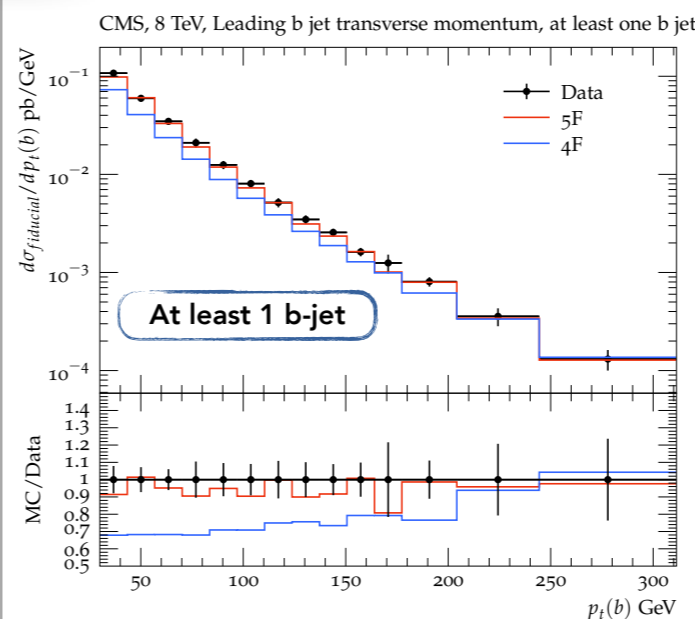
The observed effect is characteristic of enhanced jet quenching in high EA collisions.

However, before concluding that its origin is indeed jet quenching, all other potential sources must be eliminated.

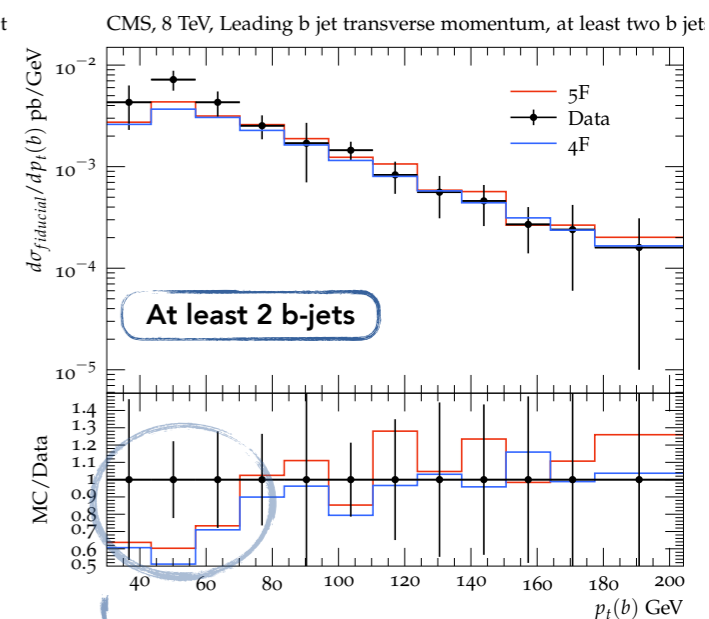
P. Jacobs

G. Sorrentino et al.

Directly sensitive to the b quarks PDF and the initial-state gluon splitting



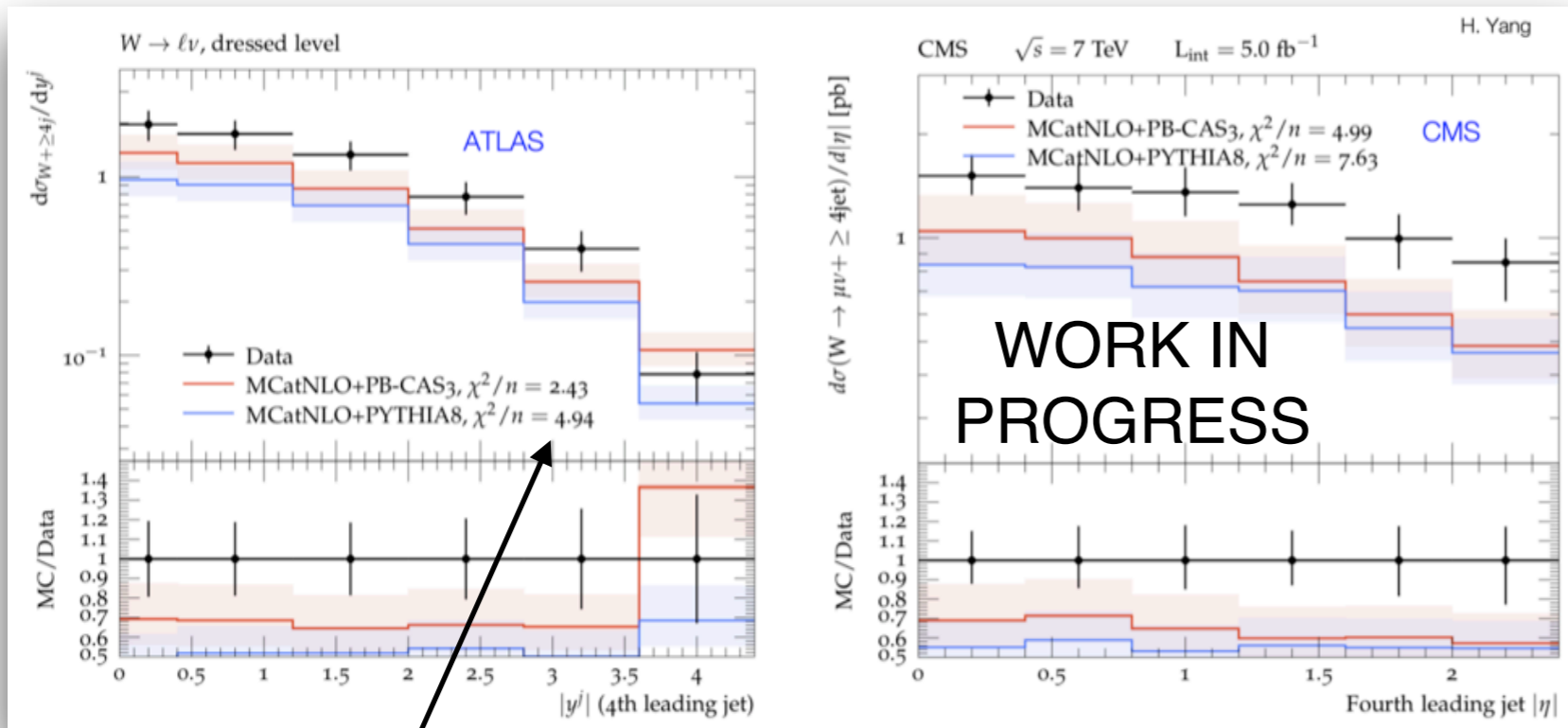
• Good agreement with 5F scheme



Underestimation for $p_T < 80$ GeV

Benchmark Comparisons

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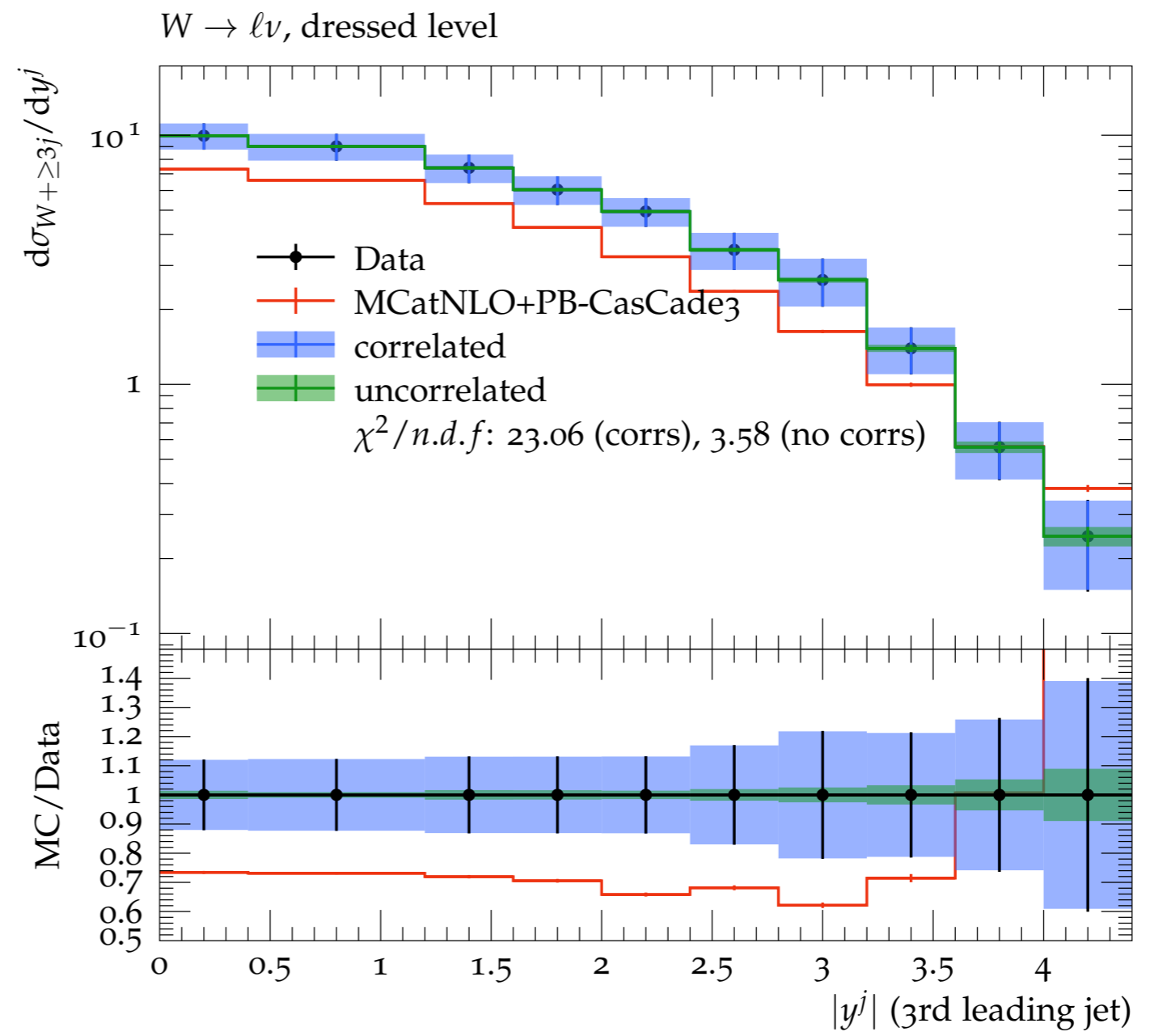
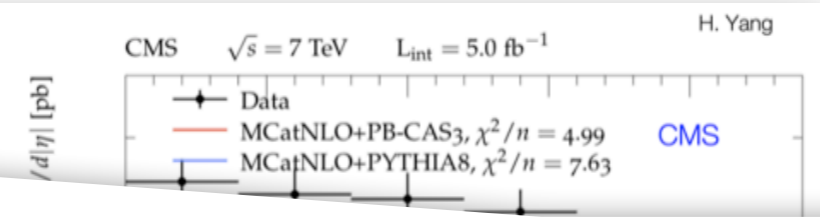
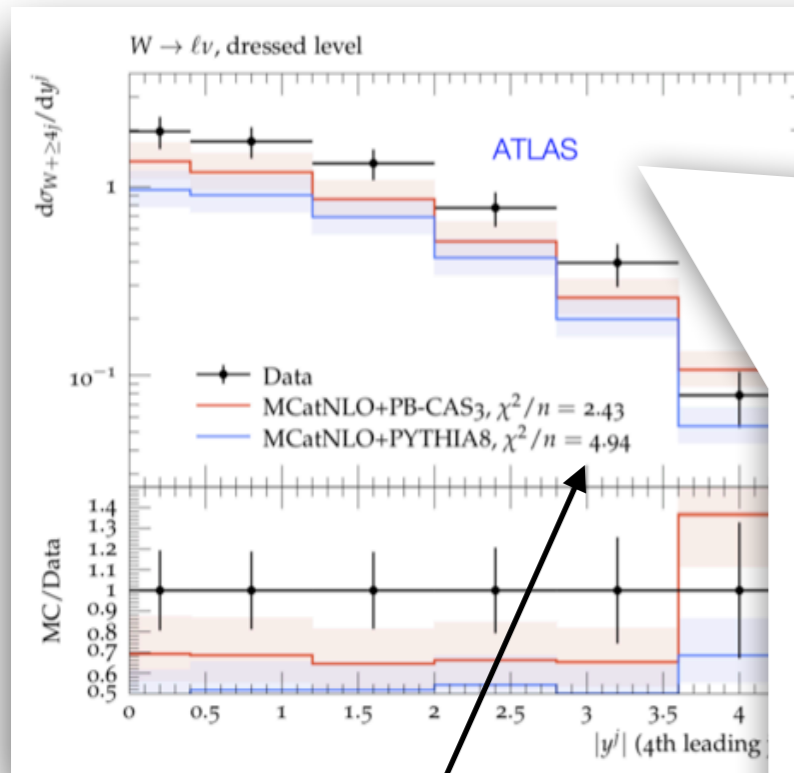


Hannes Jung
and Heng Yang

Not yet full covariance matrix, but have the information and setting that up.

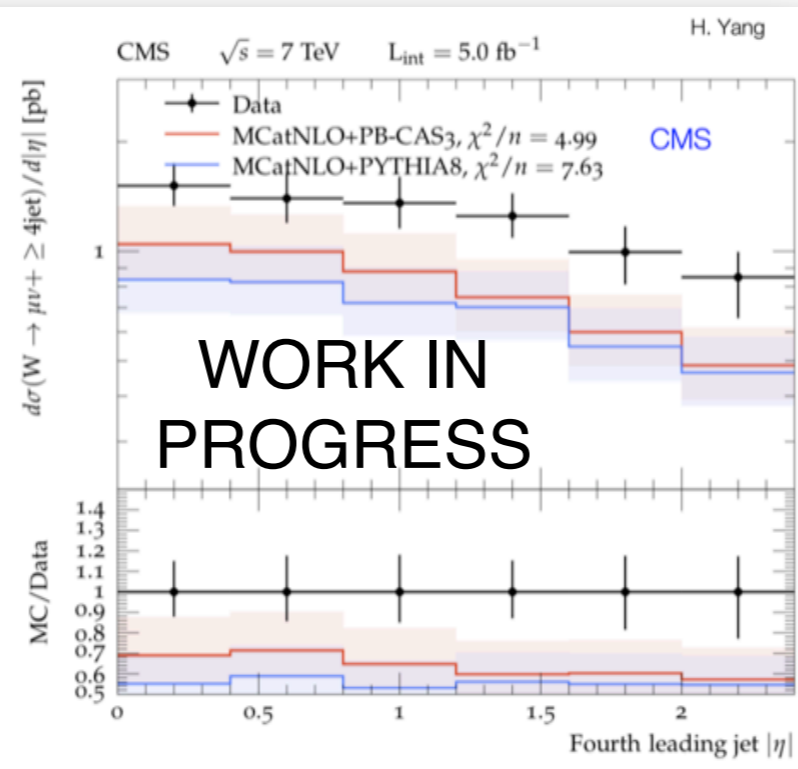
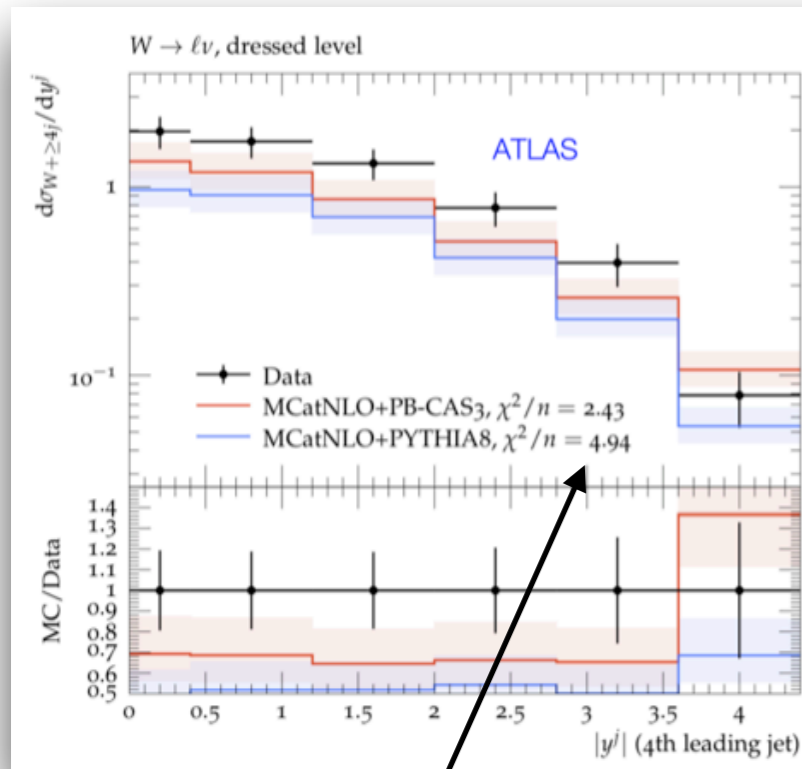
There are key Z/W+jets measurements that we have from both ATLAS and CMS and we can use them for studying different models as well as studying consistently between experiments.

Benchmark Comparisons



Not yet full covariance matrix, but have **the information and setting that up.**

Benchmark Comparisons



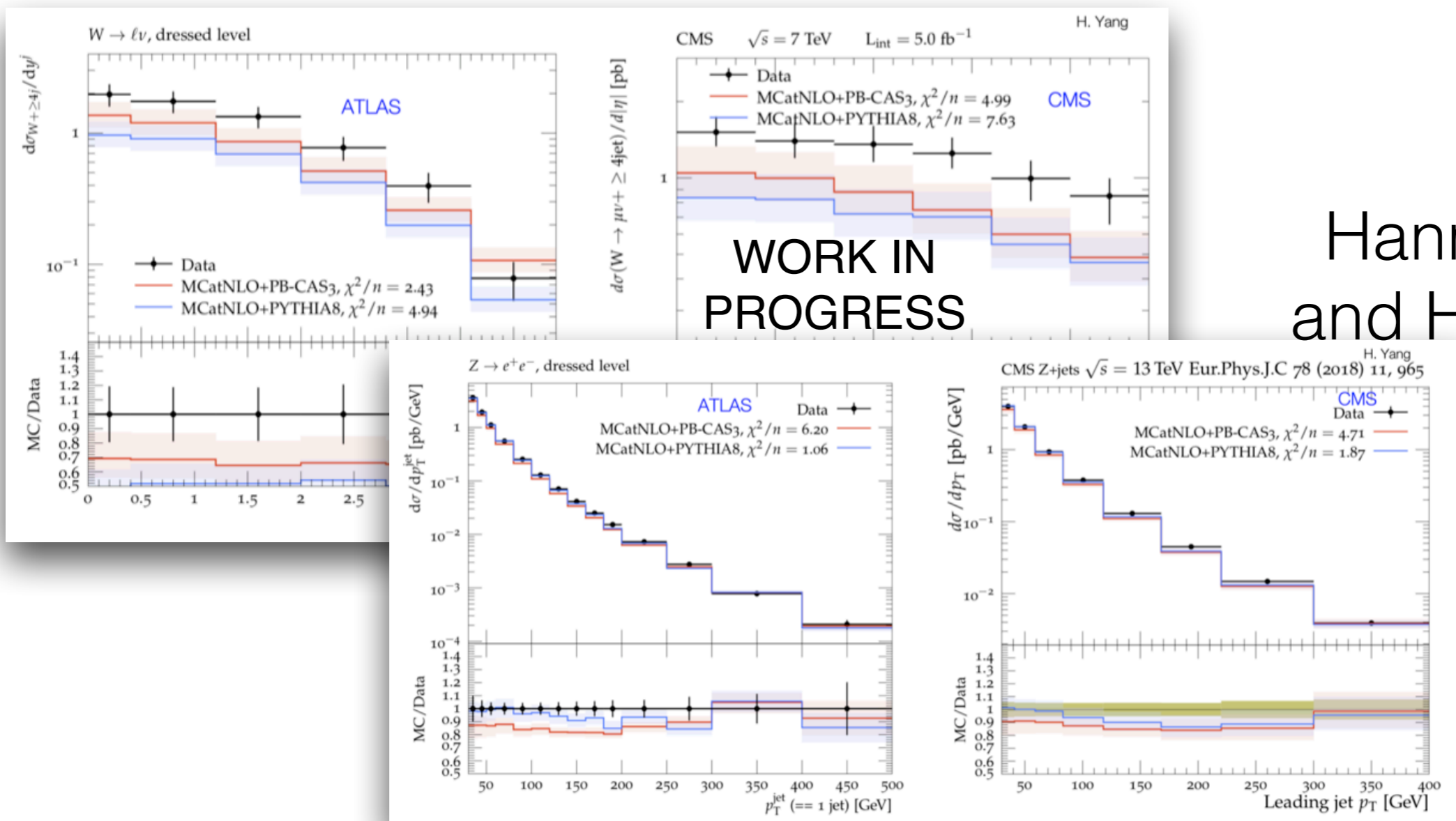
Hannes Jung
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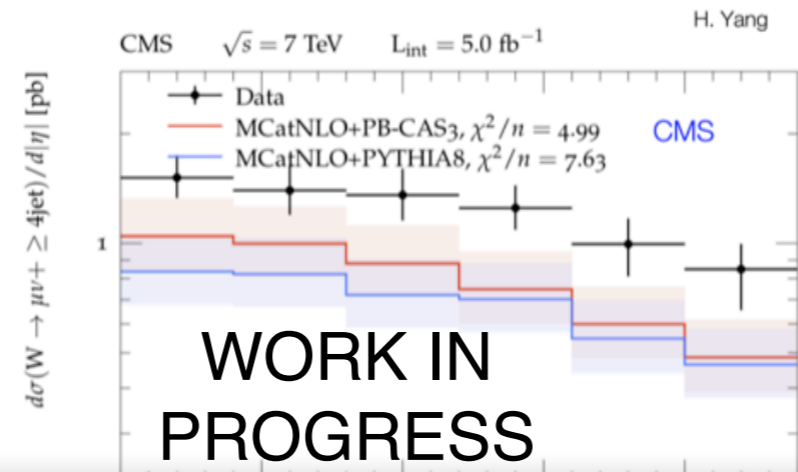
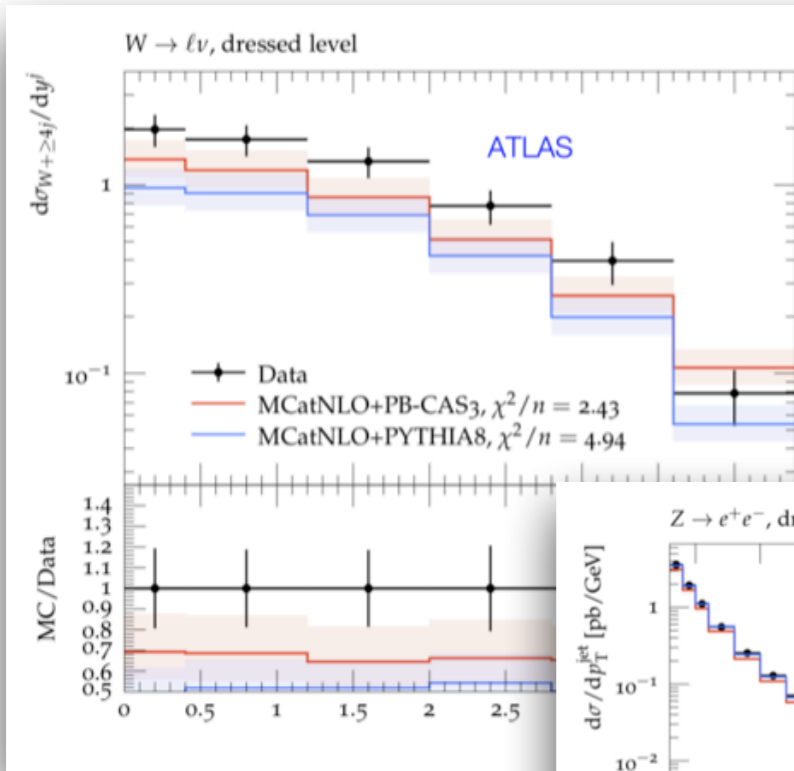
Benchmark Comparisons

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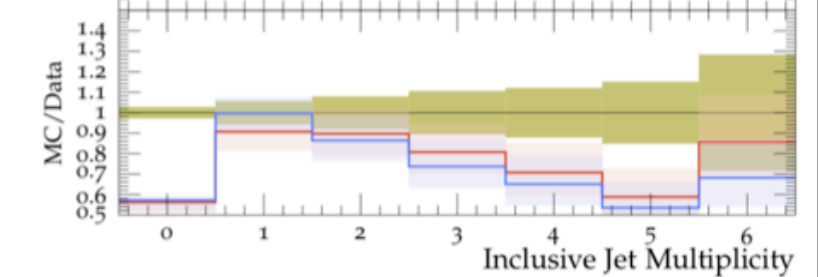
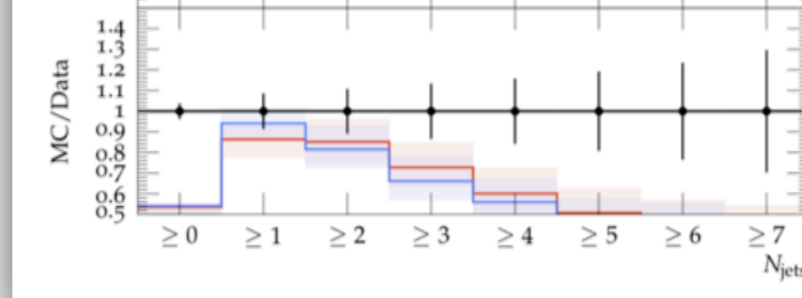
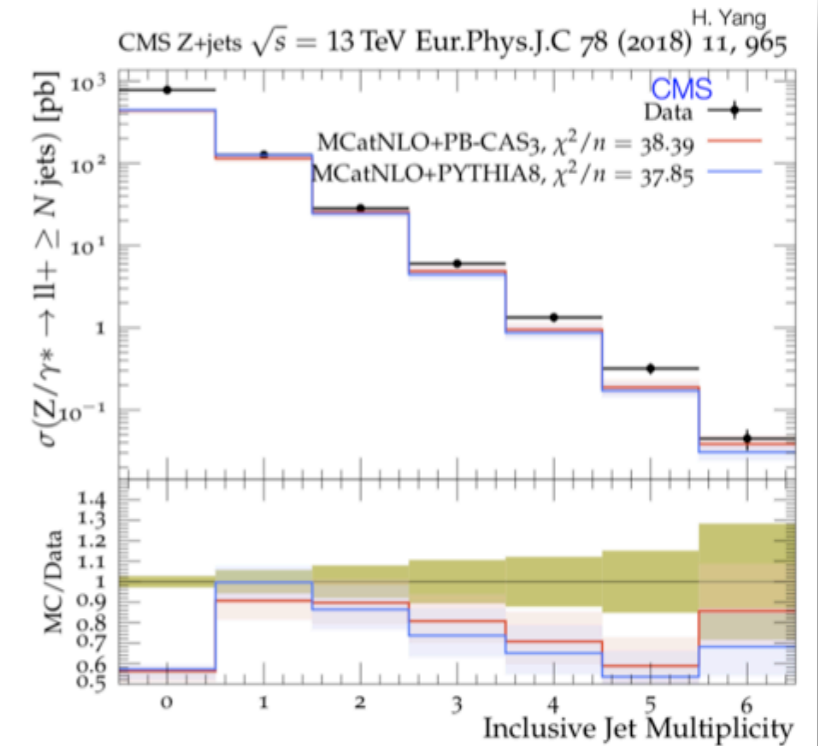
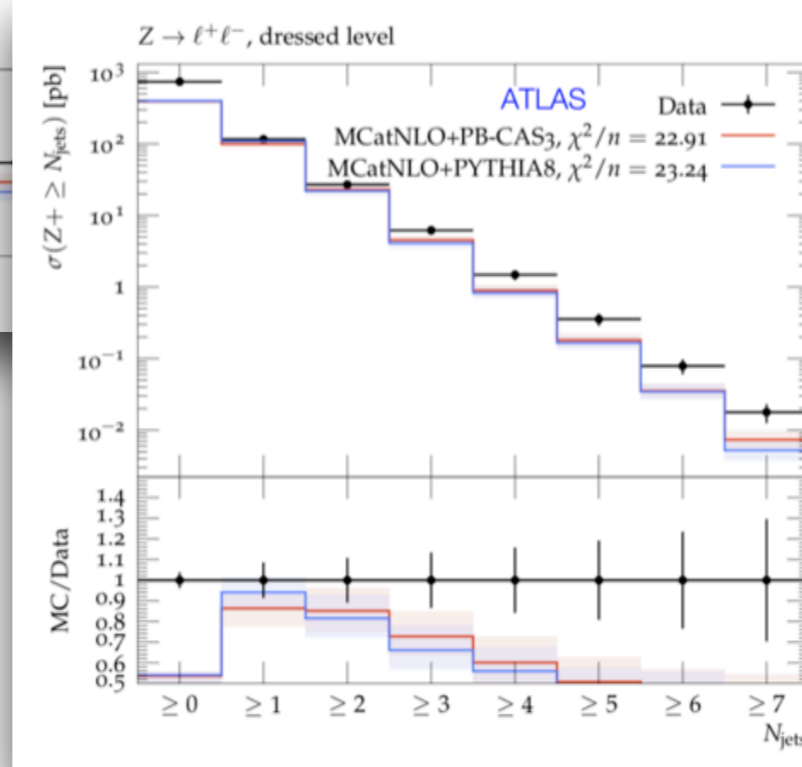
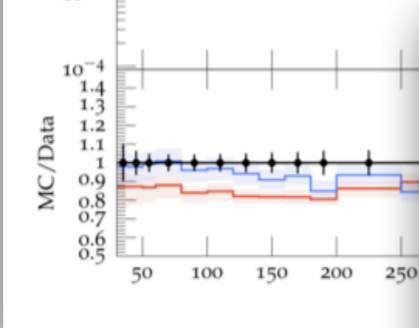
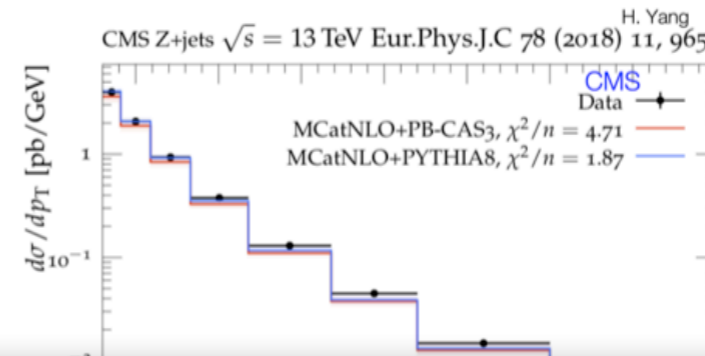
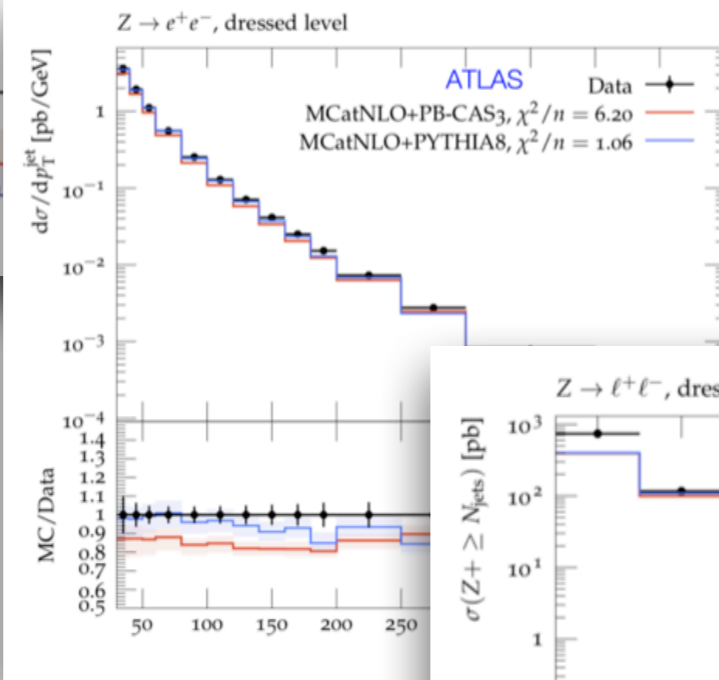
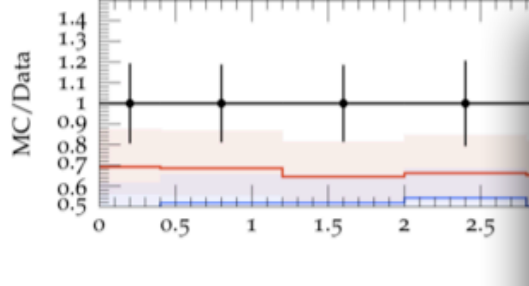


Hannes Jung
and Heng Yang

Benchmark Comparisons



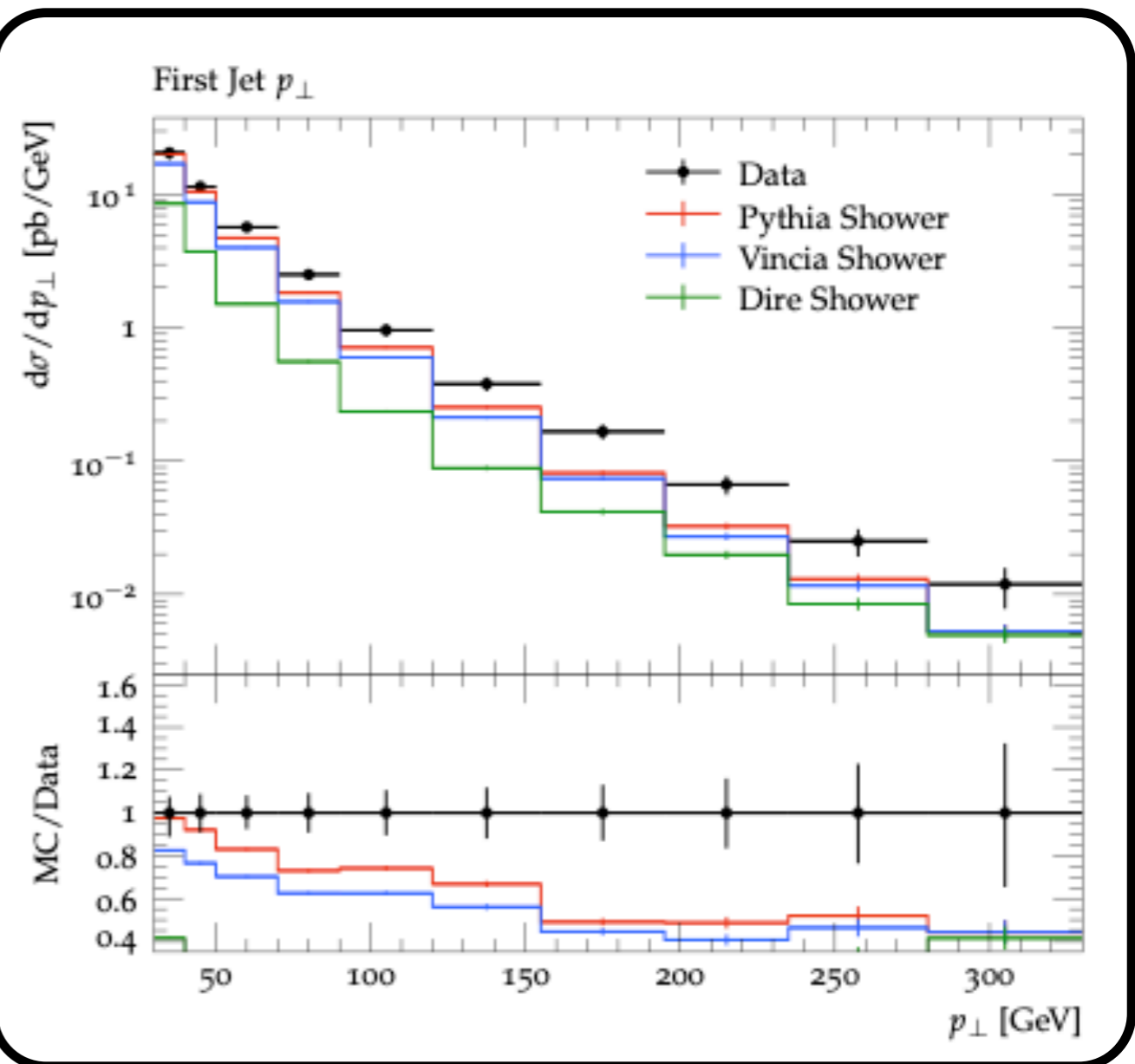
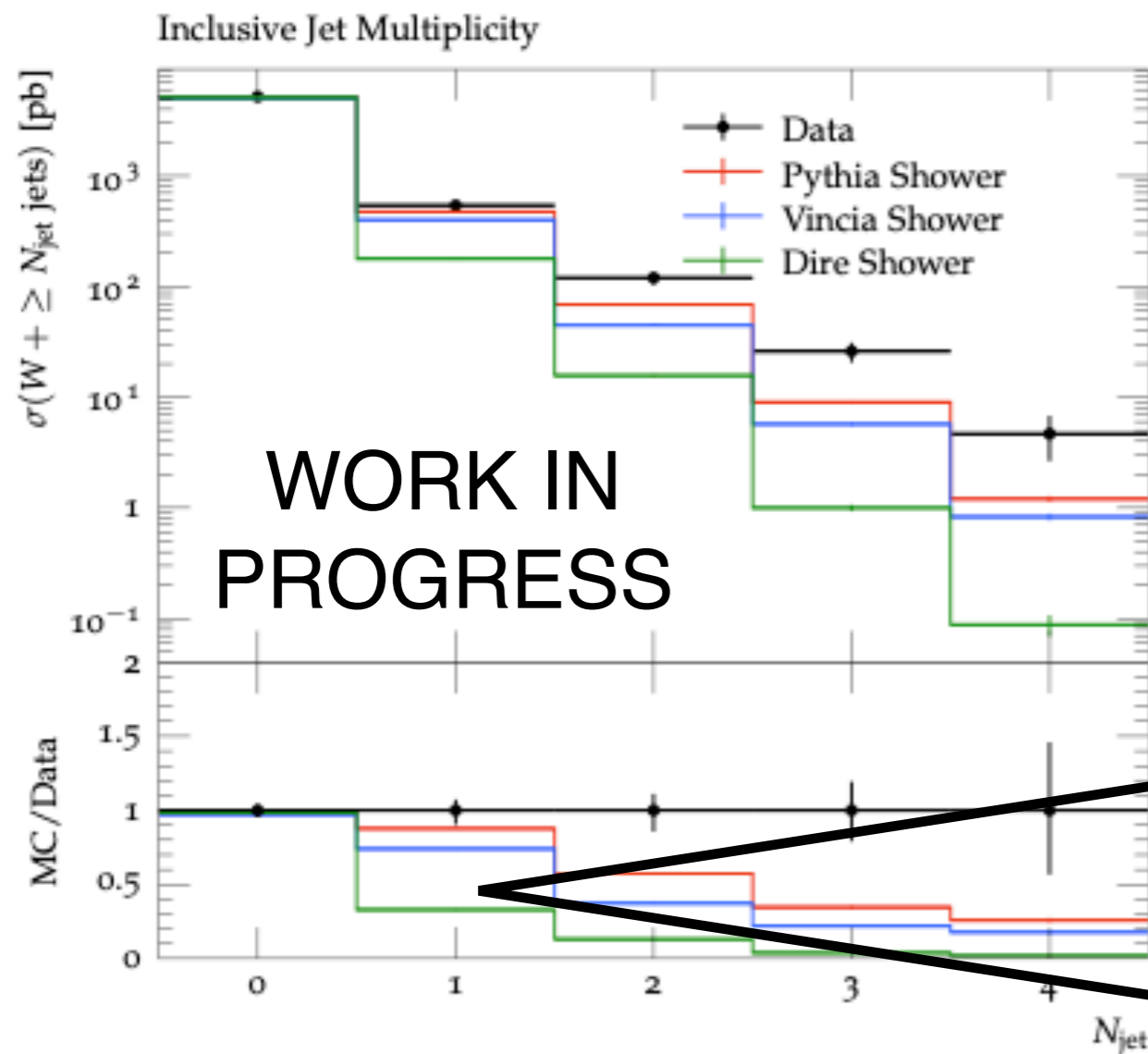
Hannes Jung
and Heng Yang



Benchmark Comparisons - variations

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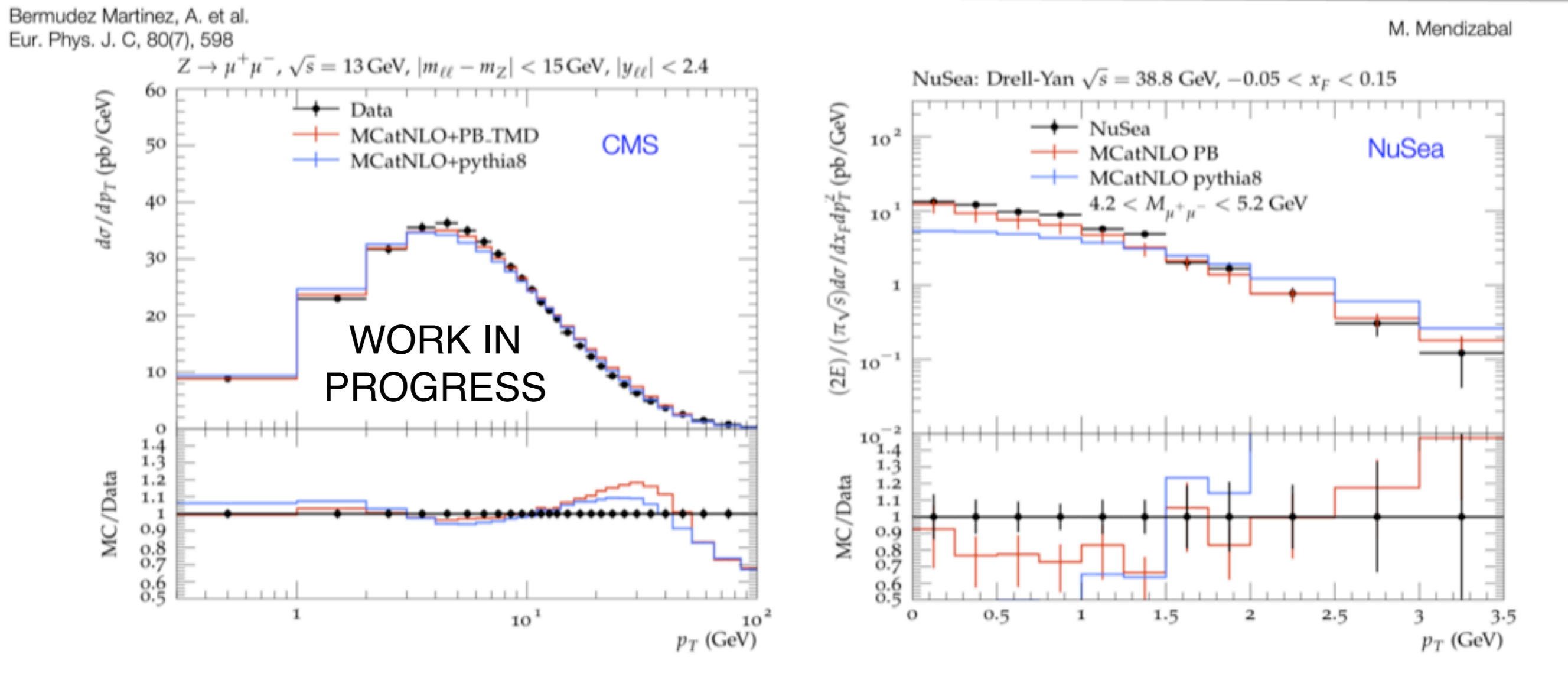
Comparison of different shower algorithms - LO only in these plots, but already interesting trends



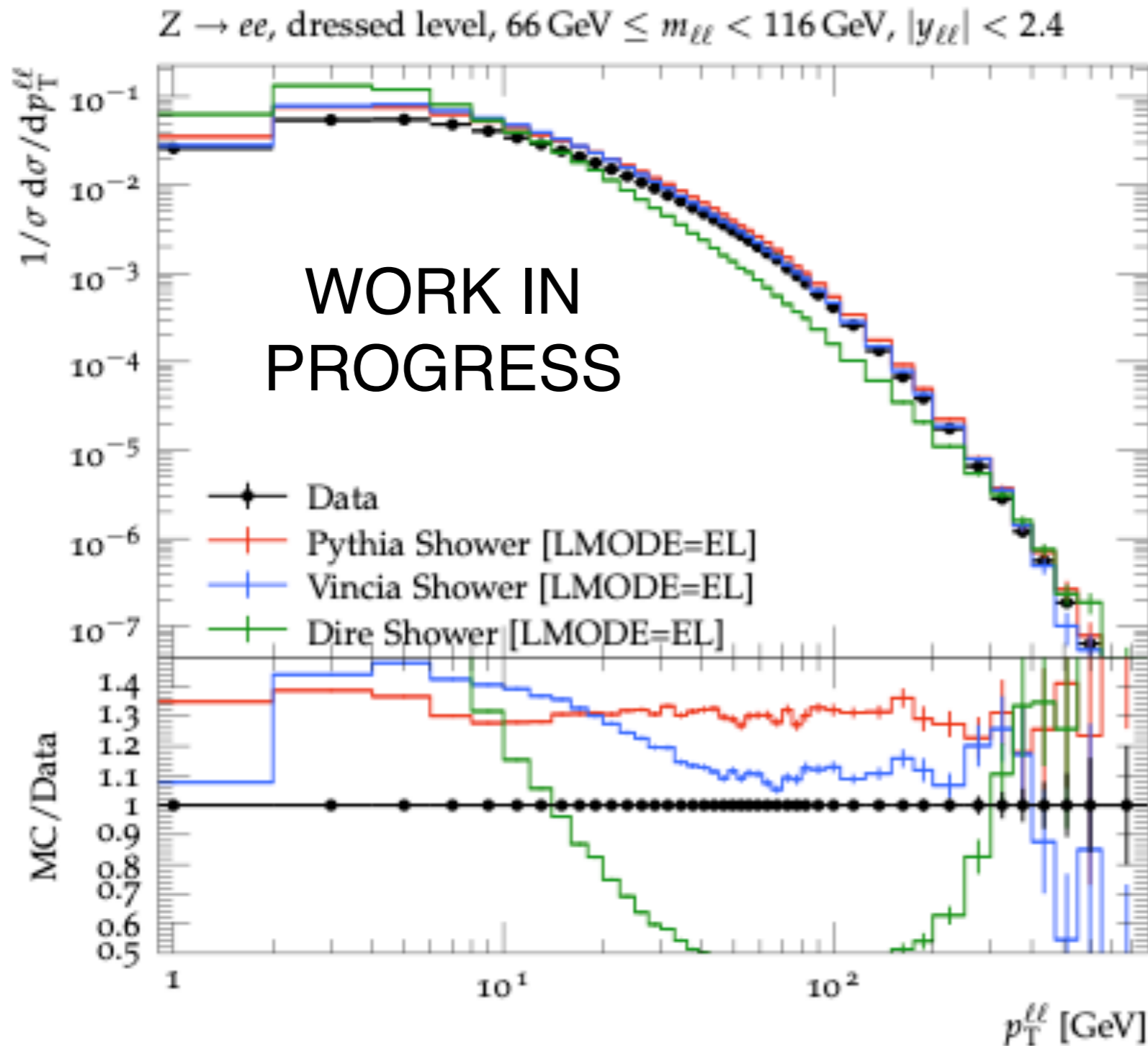
Hugo Beauchemin, Vincent Croft, Alec Drobac (Tufts)

Intrinsic k_T

One goal is the extraction of intrinsic k_T



Really need measurement with low $m_{\ell\ell}$ - not yet available from LHC. At lower $m_{\ell\ell}$, predictions diverge (*can Pythia be tuned to improve description?*)



We can also use these data to study various showers that should be relevant in the resummation regime.

There has been recent interest across the experiments to use the LHC EW jets and EW bosons forum for comparing notes and results as well as coordinating future measurements.

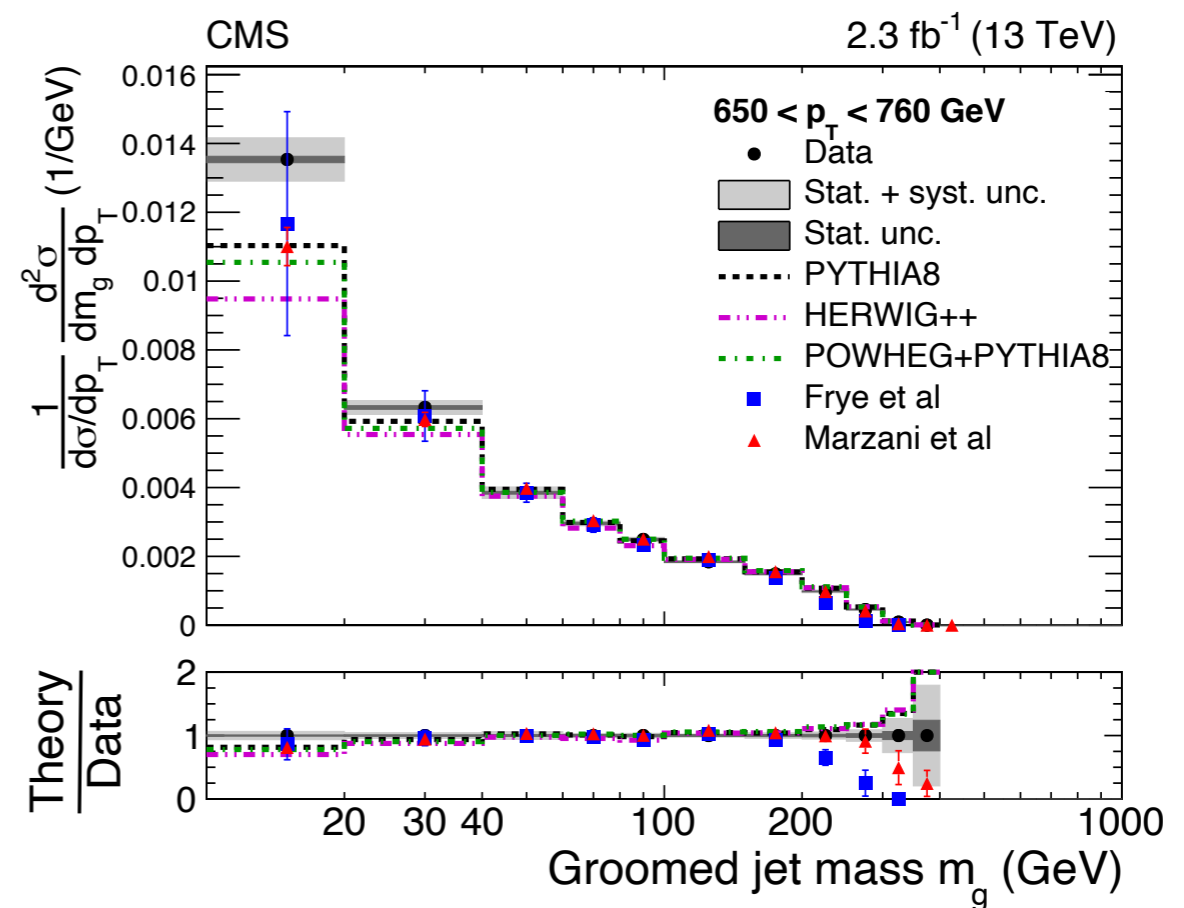
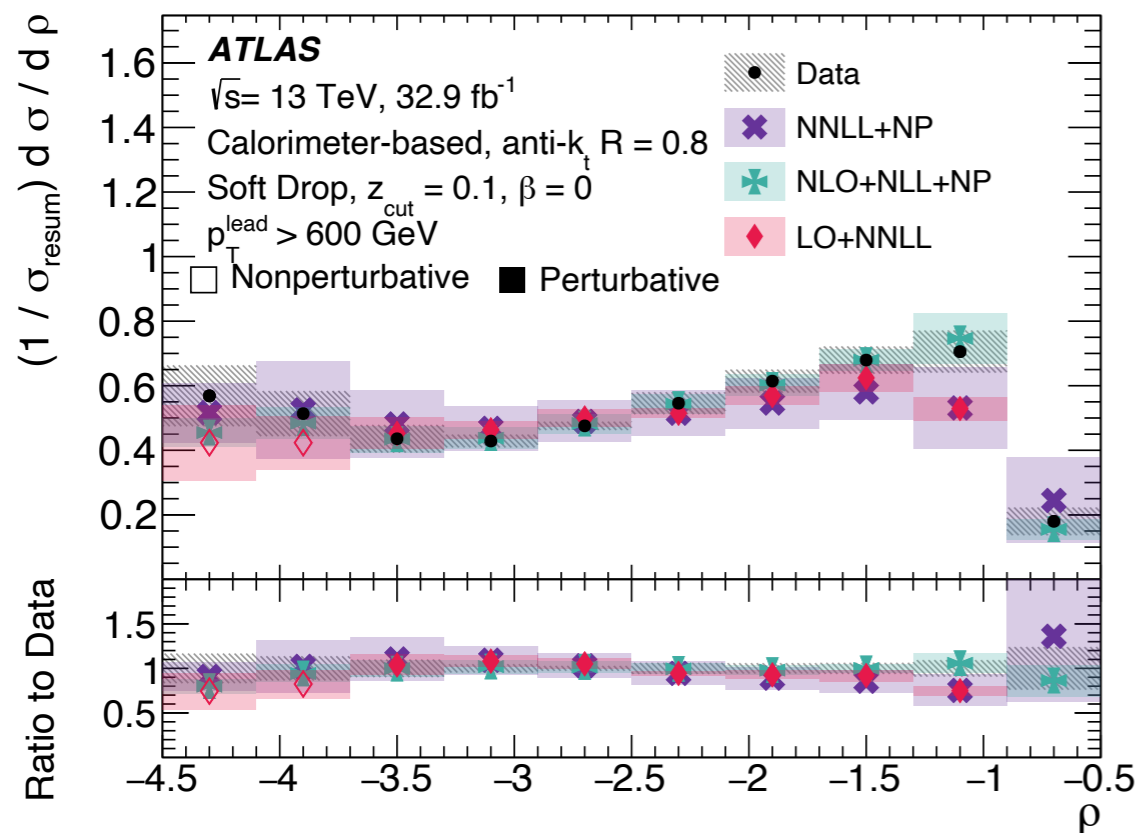
[https://twiki.cern.ch/twiki/bin/view/LHCPhysics/
LHCJetSubstructureMeasurements](https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCJetSubstructureMeasurements)

*Includes recent measurements and
a list of known Rivet routines*

Jet Substructure Studies

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One challenge with existing measurements is that the observables and/or binning is different so direct comparisons are not possible.

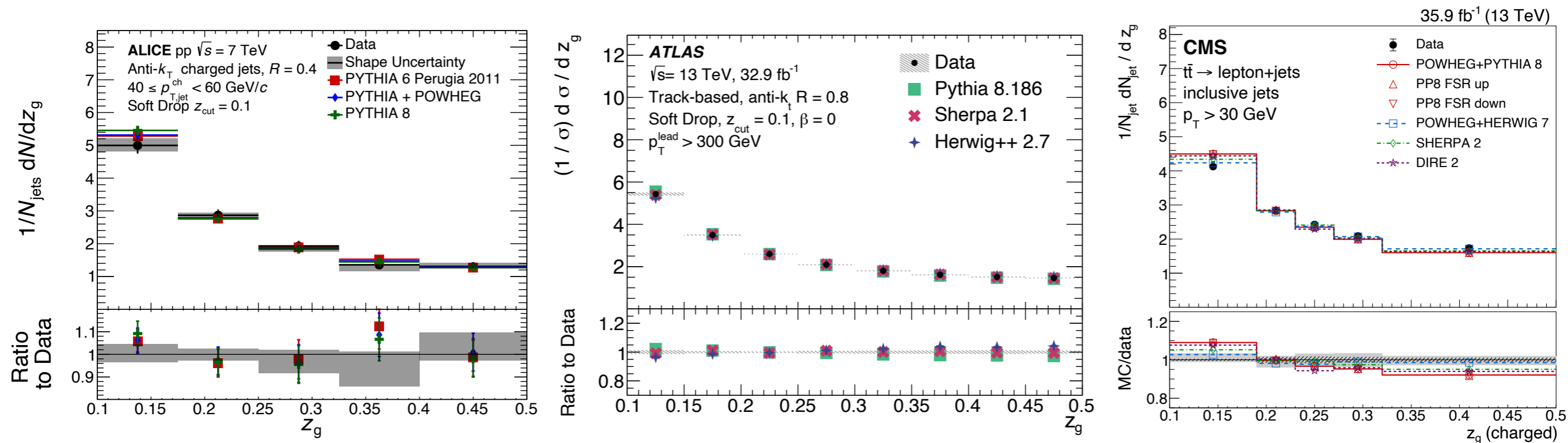


Many of our measurements are not stats limited, so a combination may not be useful, but a comparison would be a very useful exercise with the potential to improve individual measurements in the future.

Jet Substructure Studies

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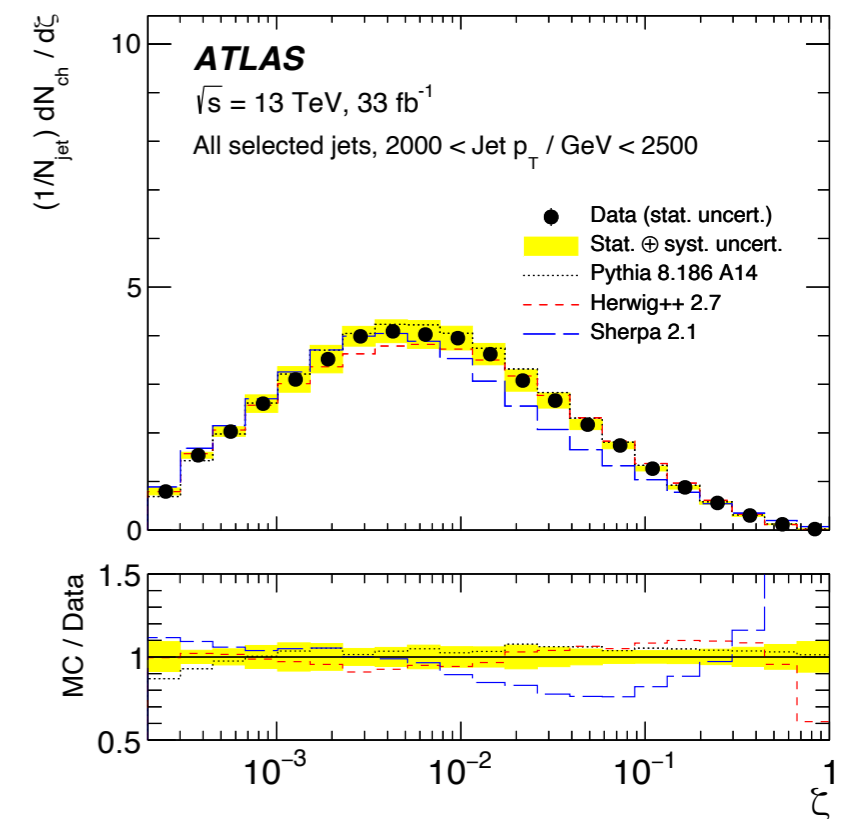
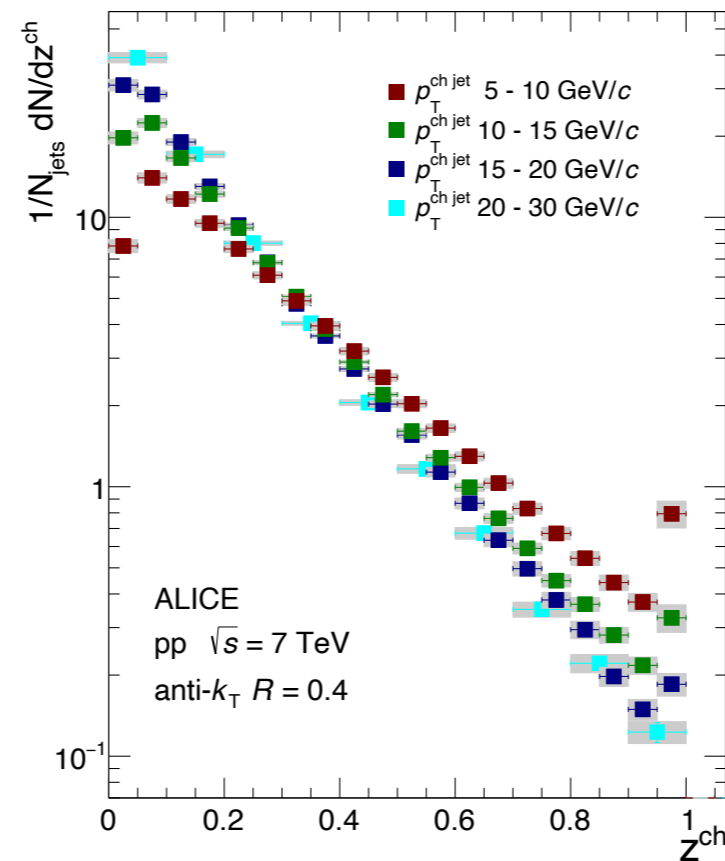
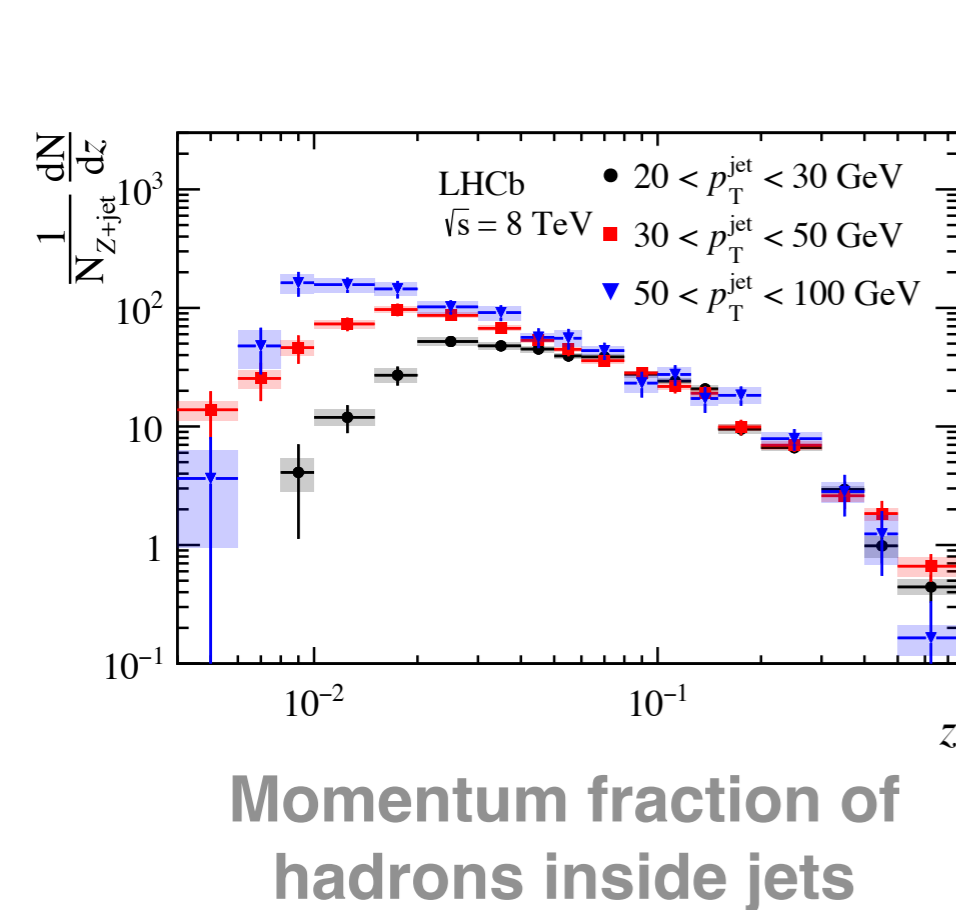
**Momentum fraction of
“hardest splitting” inside jet**

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Jet Substructure Studies

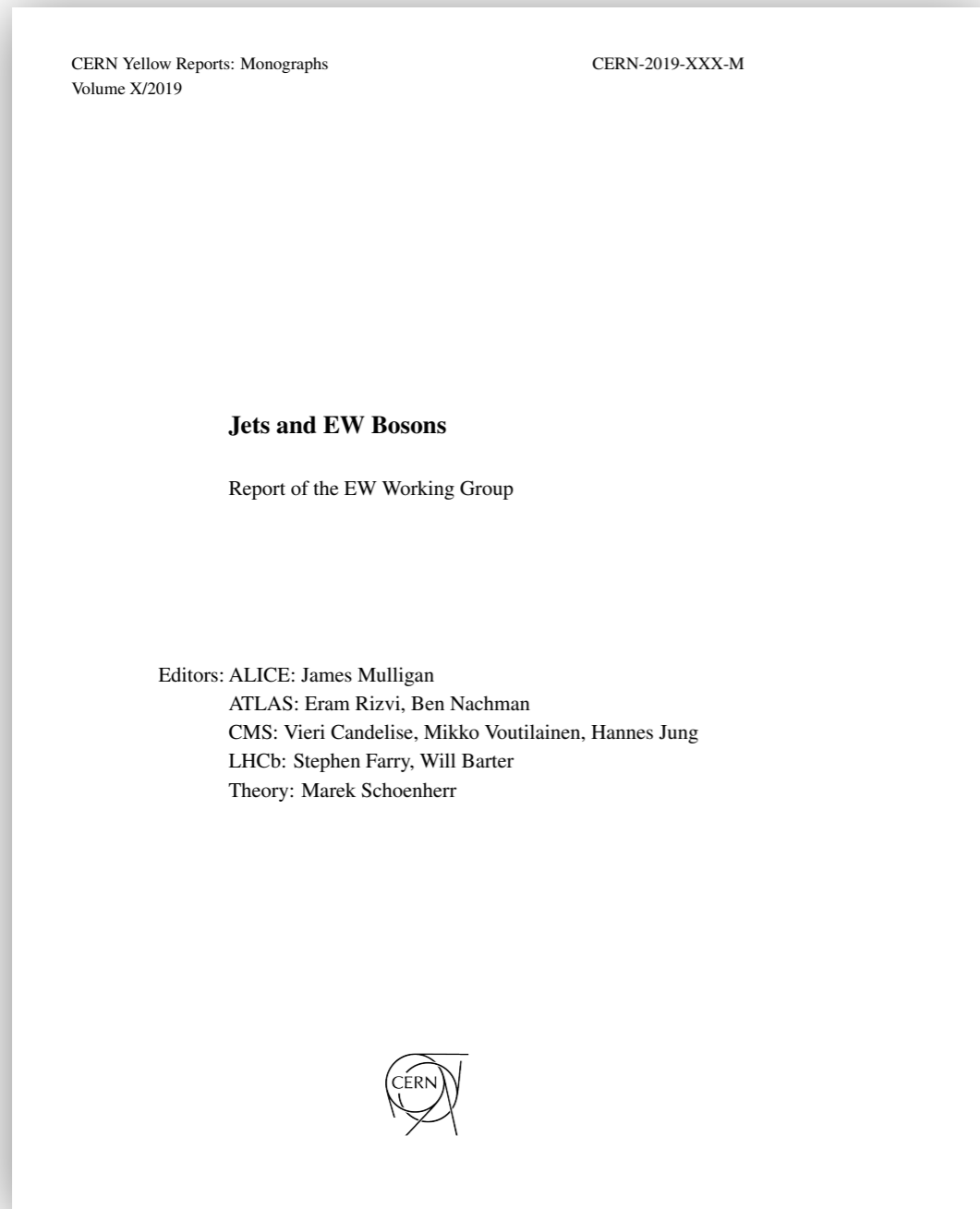
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Yellow Report Status



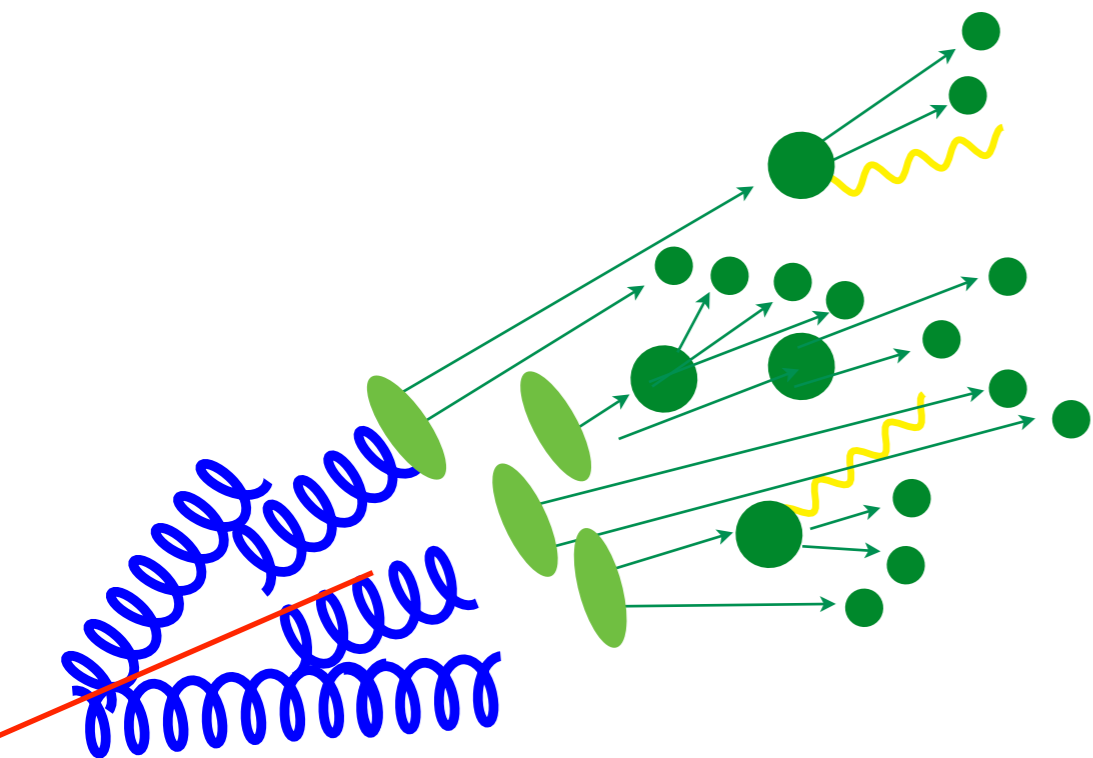
The report itself has basic structure, but work is ongoing.

<https://gitlab.cern.ch/lhcewkwg/lhcewkwg-vjets/yellowreport>

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Jets and electroweak bosons offer a rich set of data for exploring interesting effects. These data also can be used for important cross-collaboration comparisons.



We now have active participation from all four LHC experiments and we are working towards a first combined document for the group's activities.

Questions?

