

# **W+jets Matrix Elements and ARIADNE**

Nils Lavesson

`Nils.Lavesson@thep.lu.se`

Department of Theoretical Physics  
Lund University

# Outline

- ARIADNE and CKKW
- Results
- Outlook

# ARIADNE

Main differences between ARIADNE and a conventional parton cascade.

- Formulated in terms of dipoles.
  - $2 \rightarrow 3$  partonic splittings instead of  $1 \rightarrow 2$  partonic splittings.
  - Angular ordering is inherited.
  - Only formulated for gluons.  $Q\bar{Q}$  has to be added by hand.
- Includes partial  $1/x$  resummation.
- All emissions are considered final state.
- In hadron collisions a phase space suppression is used which corresponds to ratios of PDFs.

# ARIADNE and CKKW

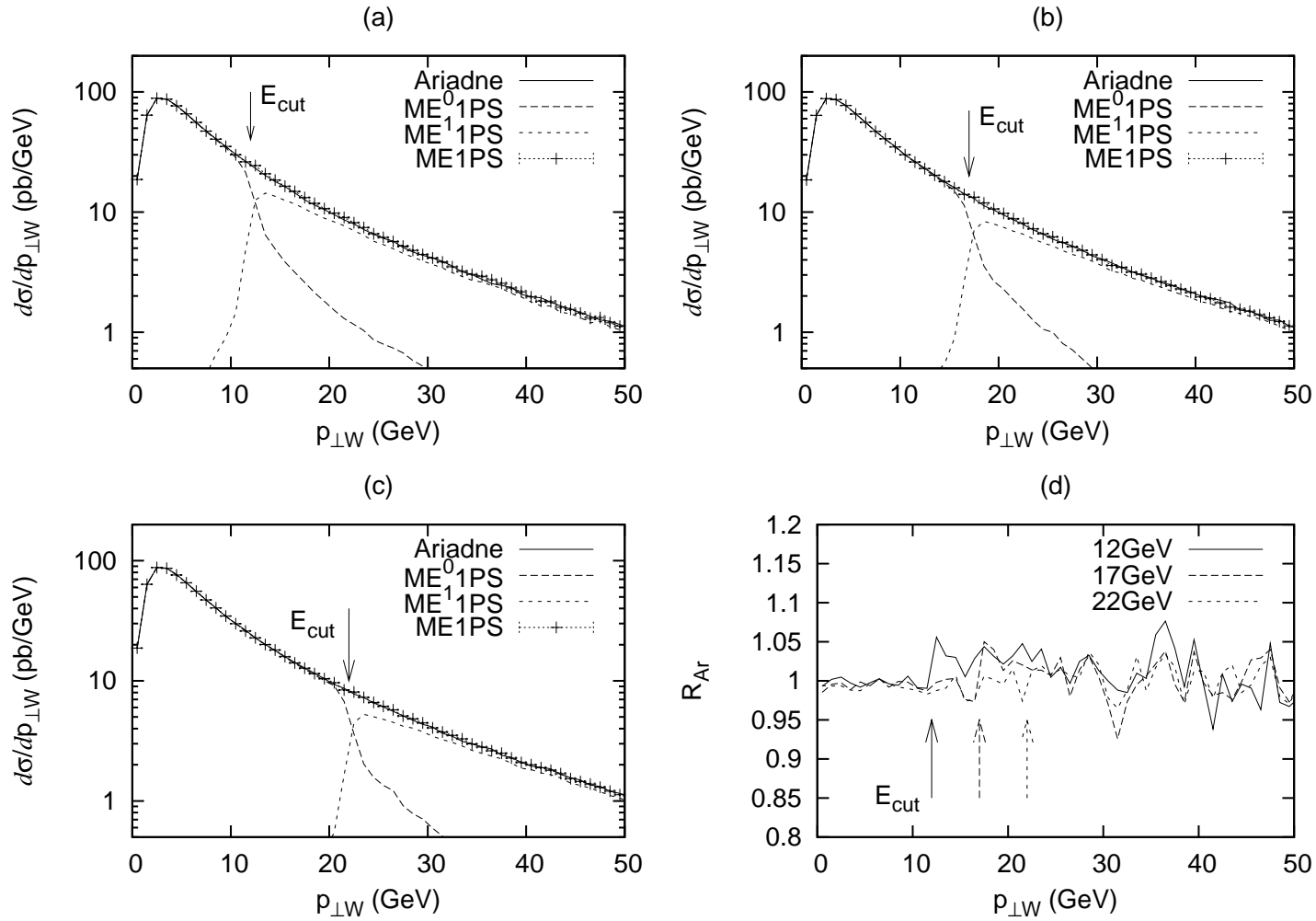
Modifications to the standard CKKW algorithm in the ARIADNE implementation.

- The ARIADNE implementation of CKKW answers the question “How would ARIADNE have generated this event?”
- Full histories with intermediate states and scales are constructed.
- The Sudakov form factors is the no emission probability, which means ARAIDNE can be used to generate the Sudakov form factors that would have been used in the cascade.
- The events are reweighted with the ARIADNE phase space suppression.

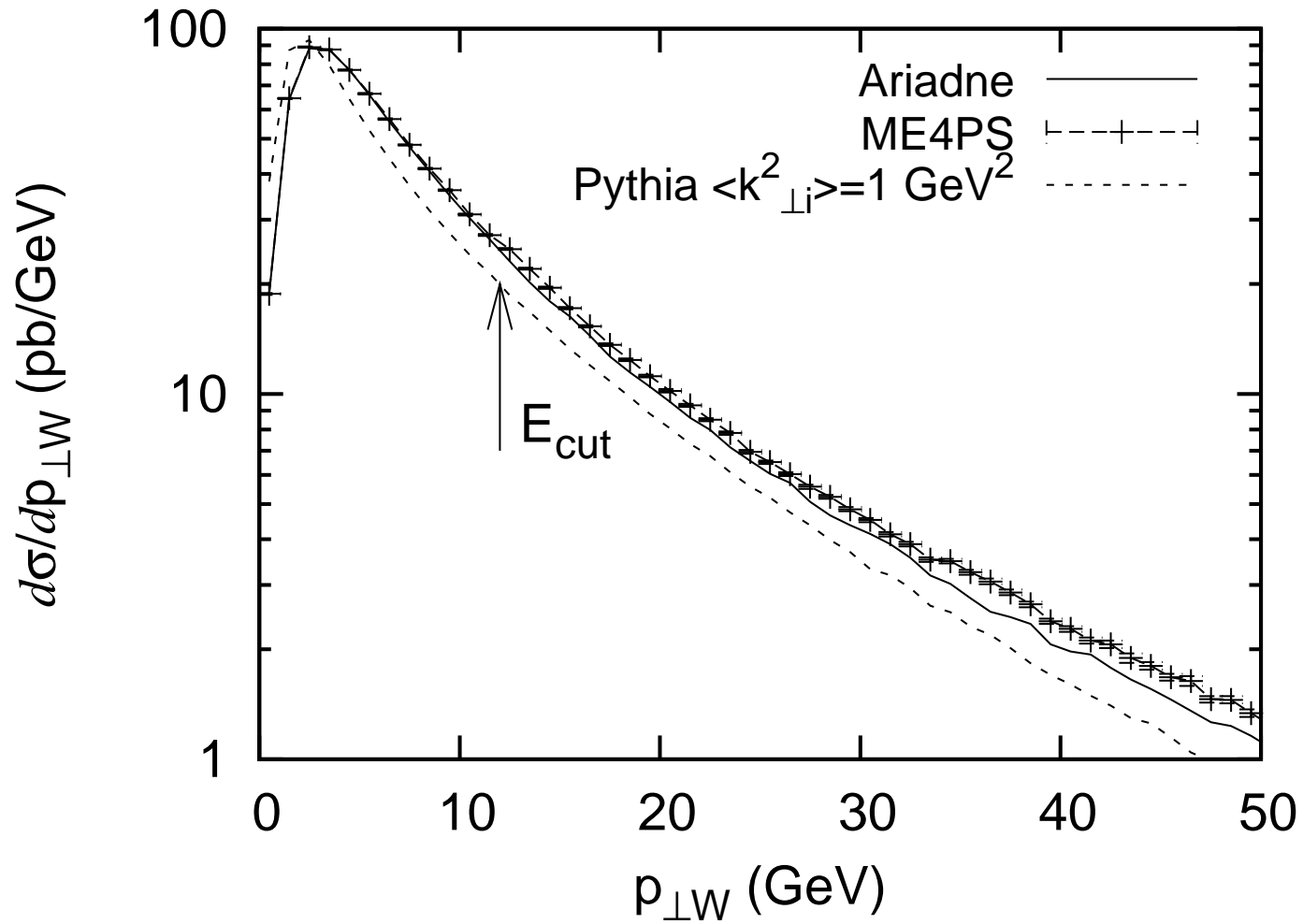
# Results

- The results are for W production at the Tevatron run II.
- MadGraph is used to generate events in accordance with matrix elements.
- The matrix element cutoff used is the KTCLUS algorithm with  $d > 12, 17$  or  $22\text{GeV}$  and  $|\eta| < 2.5$ .
- KTCLUS is used in the jet reconstruction with the parameters  $d > 12\text{GeV}$  and  $|\eta| < 2.5$ .
- Weighted events are used for technical reasons.

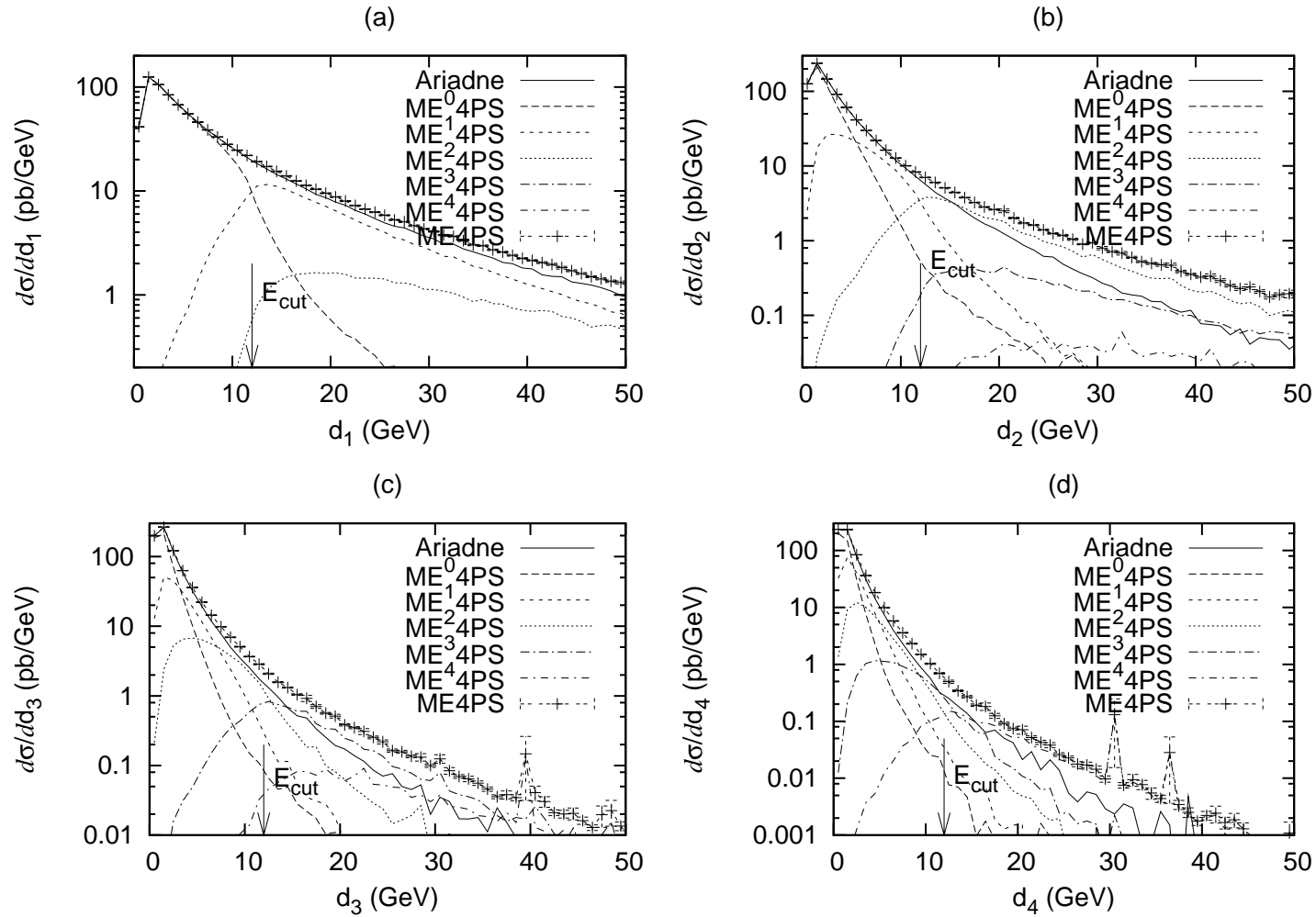
# Transverse Momentum of W



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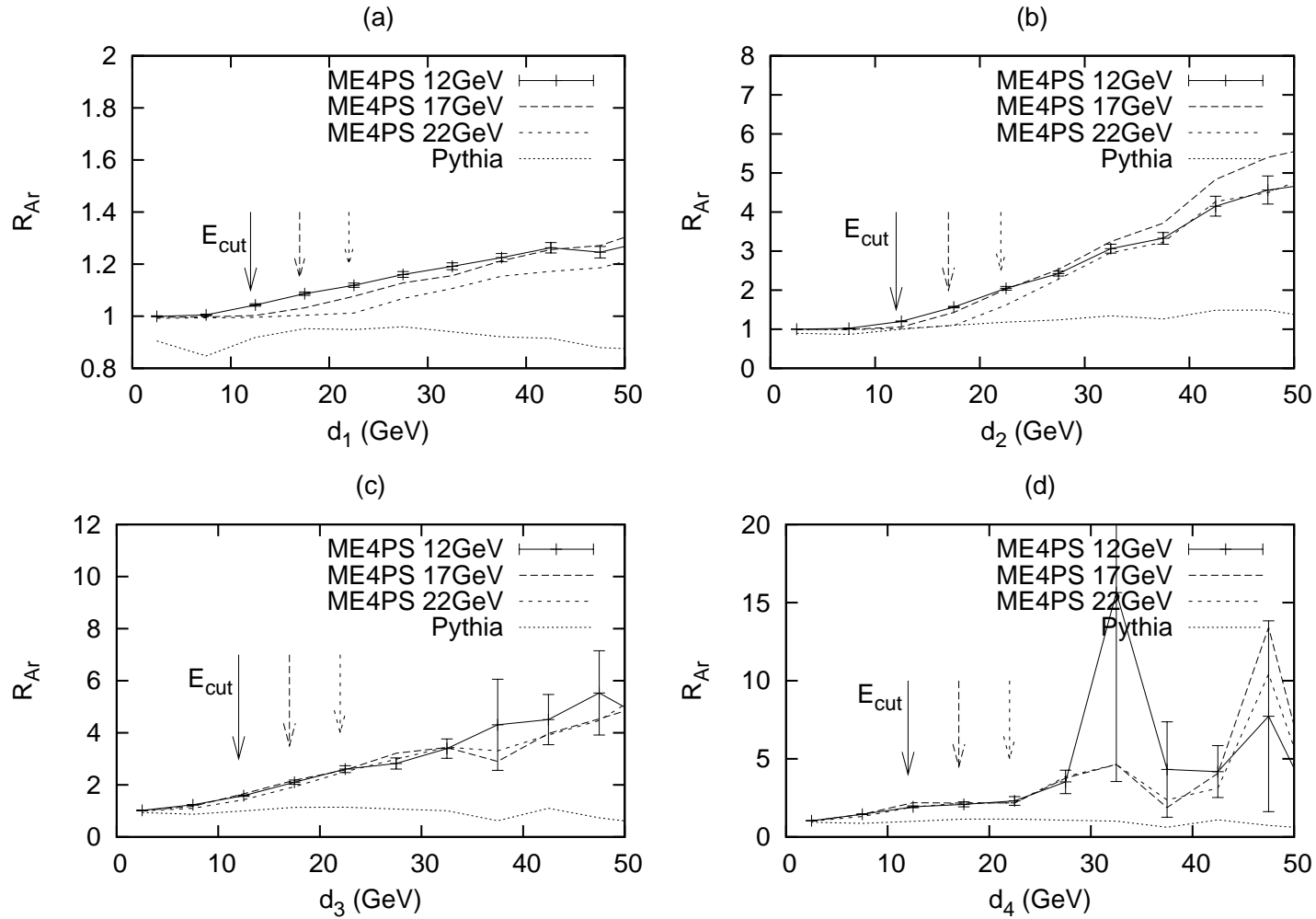


# Jets Scales

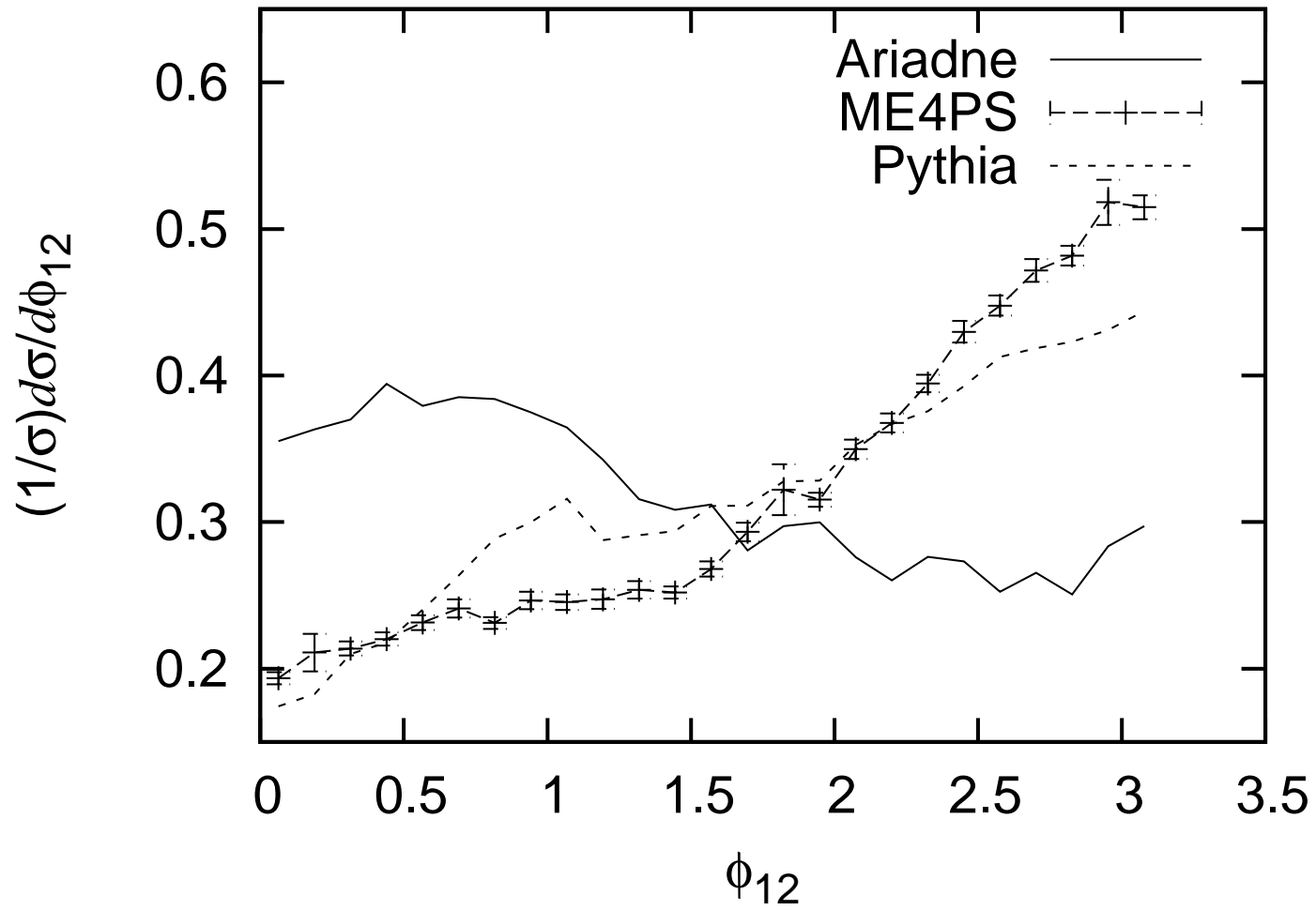




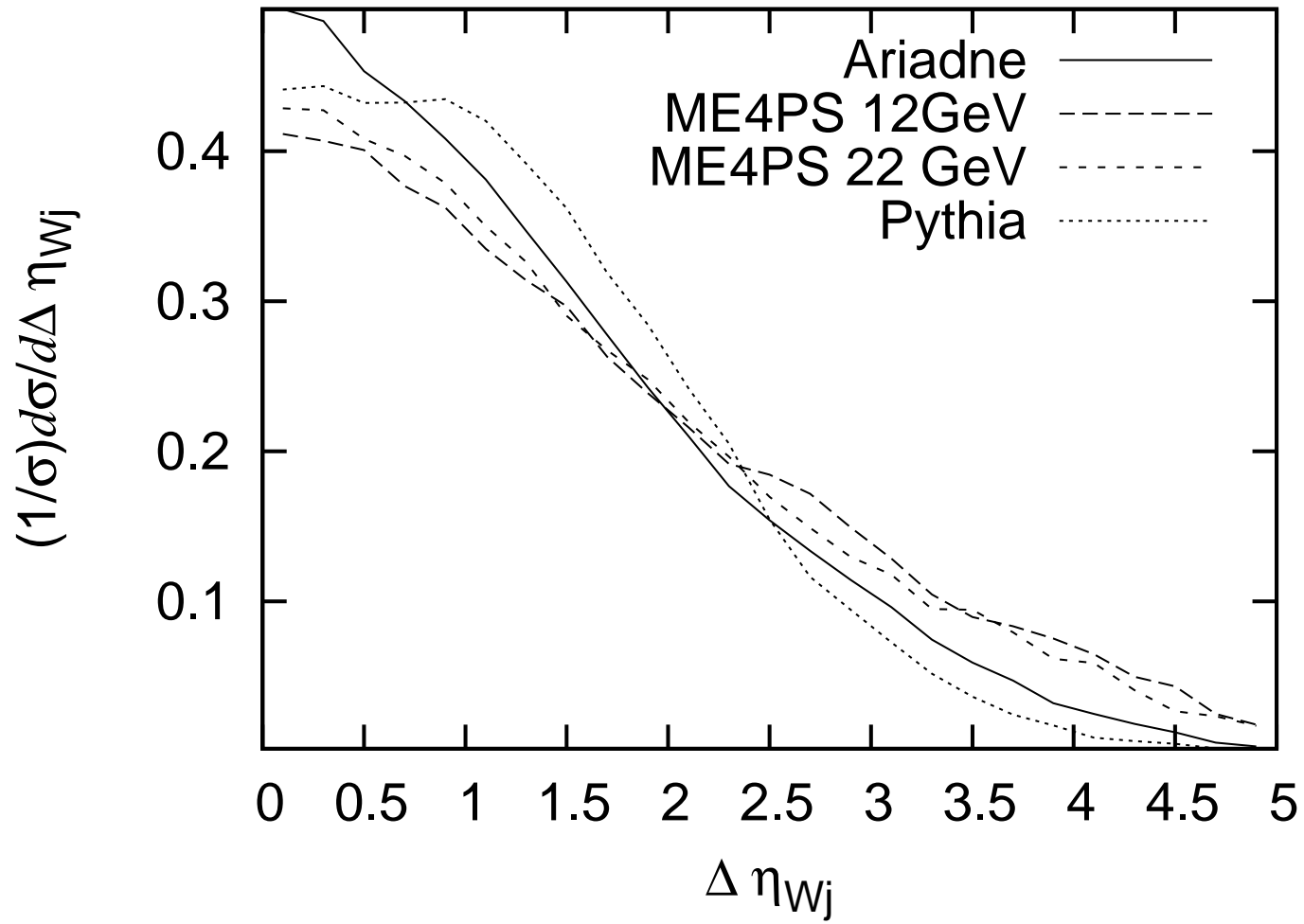
# Jet Scales Ratio



# Delta Phi



# Delta Eta



# Outlook

- W and Higgs production at LHC.
- DIS at HERA.
- Implement ARIADNE in C++