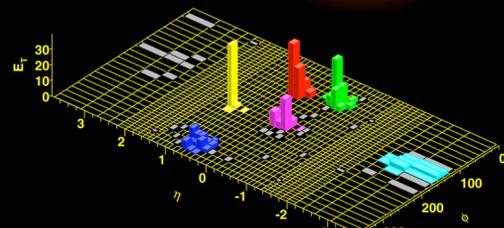
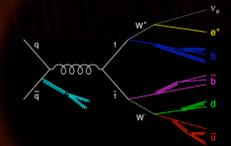


# Workshop on Monte Carlo Generator Physics for Run II at the Tevatron

1. Why are we here?
2. What do we hope to accomplish?

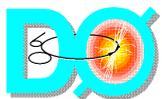
**Workshop ON  
MONTE CARLO GENERATOR PHYSICS  
FOR RUN II AT THE TEVATRON**

April 18<sup>th</sup> – 20<sup>th</sup>, 2001  
FERMI NATIONAL ACCELERATOR LABORATORY



► ORGANIZING COMMITTEE  
C. BROOIJMANS, FERMILAB  
K. ELLIS, FERMILAB  
W. GIELE, FERMILAB  
J. HUSTON (chair), MICHIGAN STATE UNIVERSITY  
A. KOTWAL, DUKE UNIVERSITY  
S. PROTOPESCU, BROOKHAVEN NATIONAL LABORATORY

FOR MORE INFORMATION: <http://www-theory.fnal.gov/runiinc>  
Sponsored by the Fermi National Accelerator Laboratory & Michigan State University



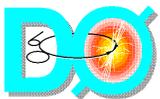
Monte Carlo Generator Physics for Run 2  
J. Huston



# Why are we here?

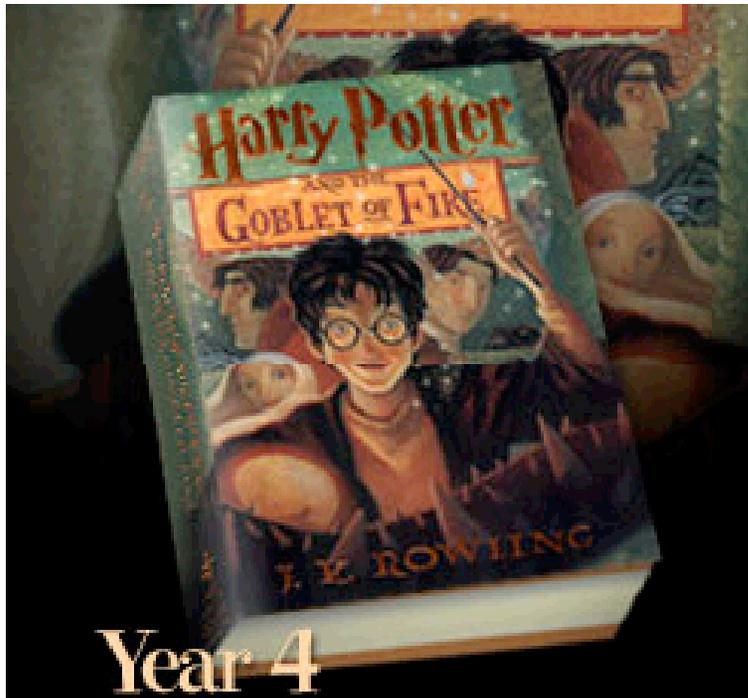
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- ...to enjoy the spring weather in the American Midwest
- ...because the Fermilab Tevatron is turning on again after a hiatus of 5 years
  - ◆ at an energy of 1.96 TeV
  - ◆ with an expected data sample of  $2 \text{ fb}^{-1}$  per experiment over the next 2 years (plus perhaps 10 times that over the following 5 years)

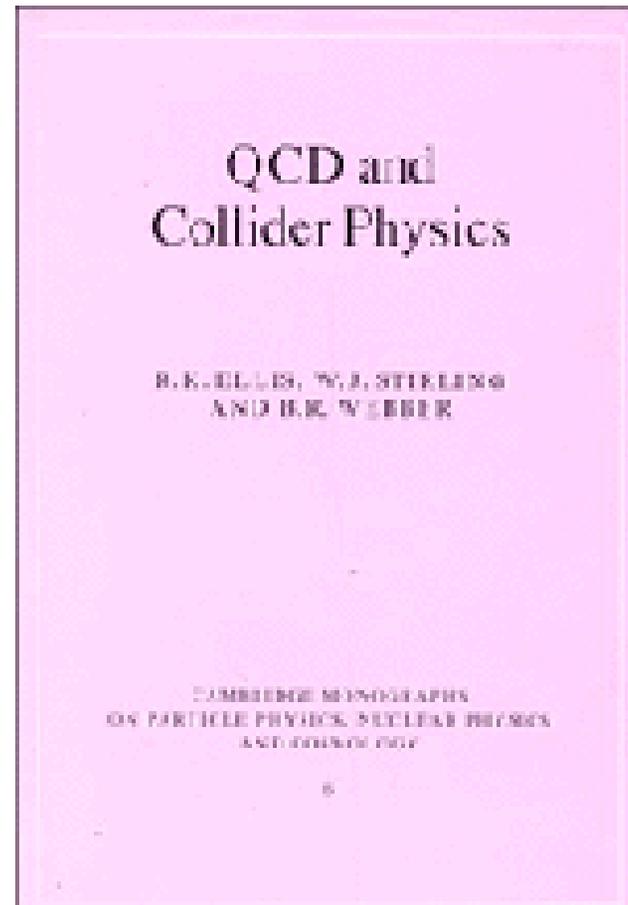


# There's a great deal of interest in collider physics.

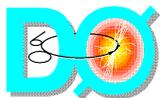
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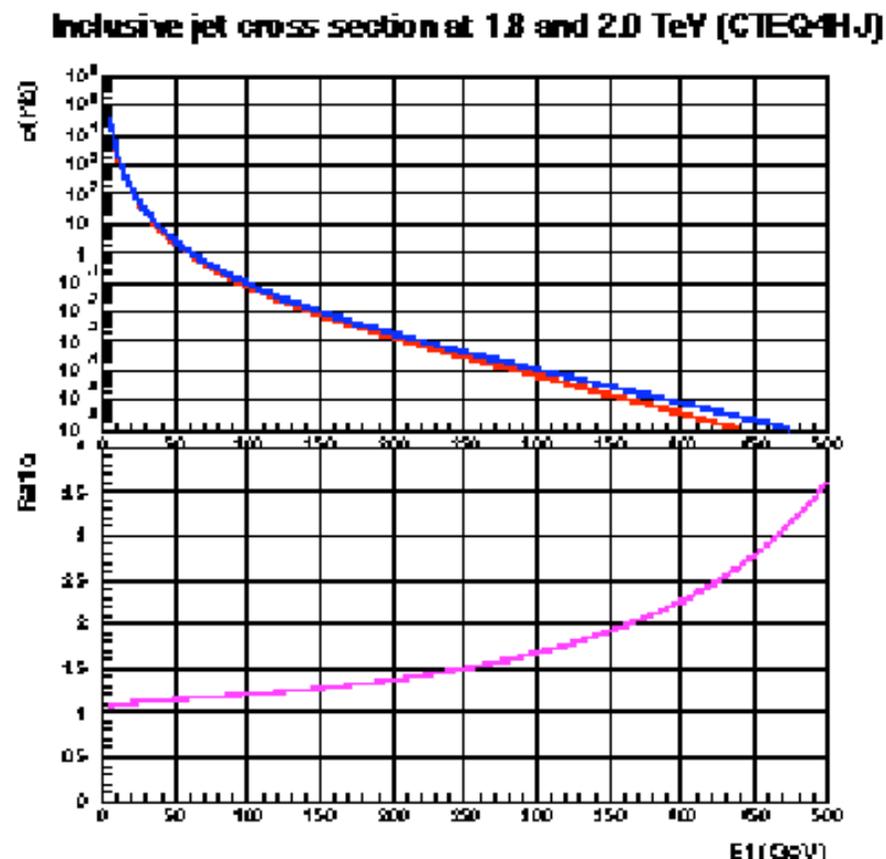


Monte Carlo Generator Physics for Run 2  
J. Huston

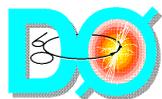


# Tevatron Run IIa

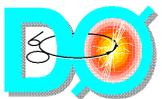
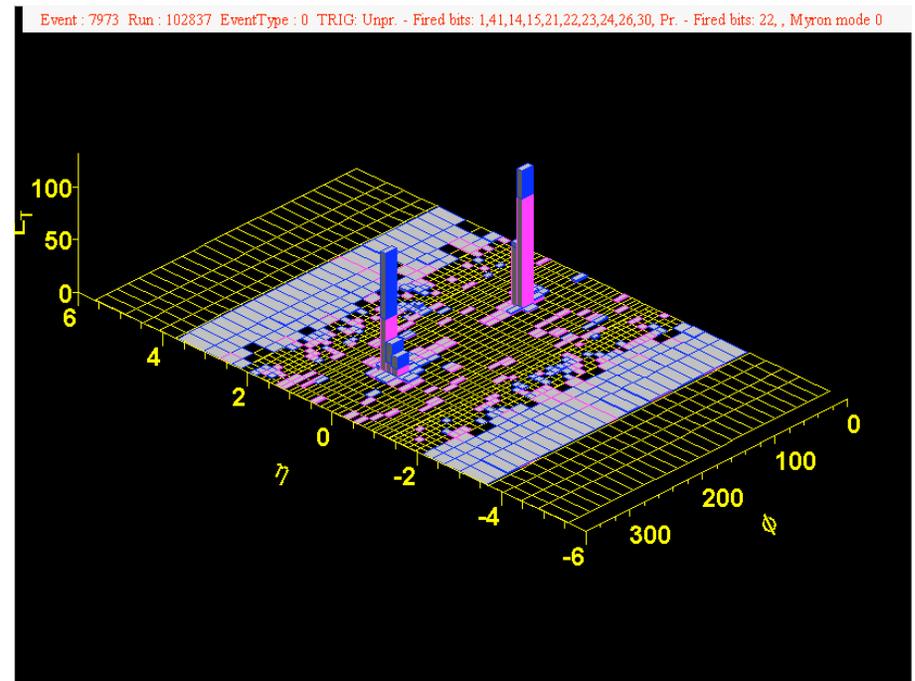
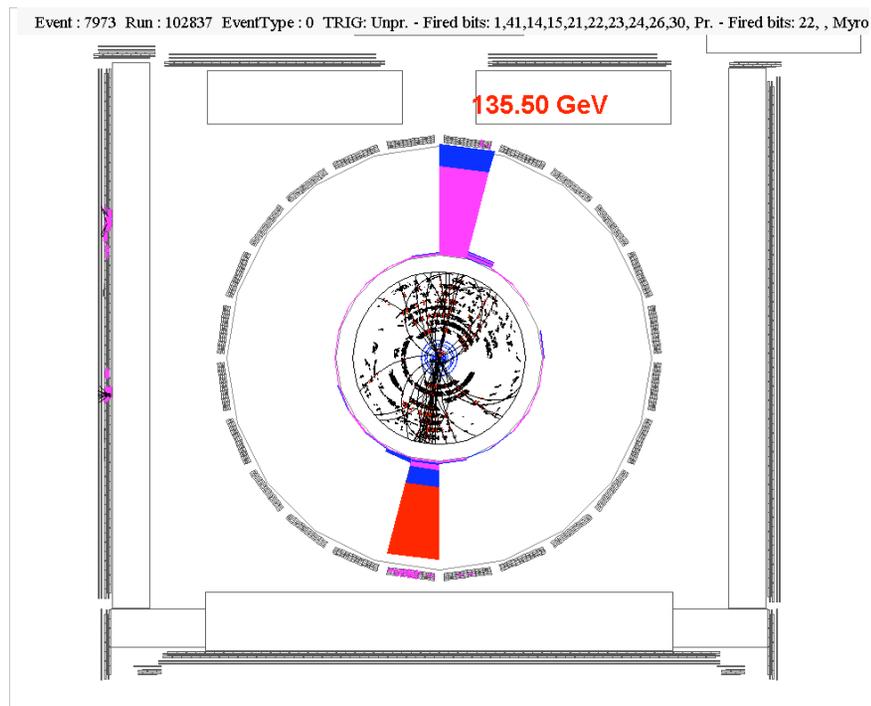
- $2 \times 10^6$  W events
- $6 \times 10^3$  jets with  $ET > 300$  GeV/c; jet  $\square$  measured precisely out to 500 GeV/c
- ? # of Higgs events



the number of jets above 400 GeV/c will increase from  $\sim 10$  to  $\sim 500$  per experiment

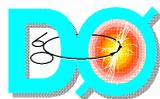


# Highest $E_T$ Jets from Run II



# What do we hope to accomplish?

- For CDF/D0 to become more familiar with the latest in theoretical tools available and soon to become available for comparisons of data to both SM and non-SM theory in preparation for Run 2 analyses.
  - ◆ this was a topic not covered extensively in the Run 2 workshops
  - ◆ both Herwig and Pythia have recently released new versions (SUSY added to Herwig)
  - ◆ growth industries in:
    - ▲ exact matrix element tools (CompHep, Grace, Alpha,...)
    - ▲ matrix element corrections to Monte Carlos
  - ◆ would like to standardize Monte Carlo corrections to matrix elements
- For phenomenologists, especially the Monte Carlo people, to become more familiar with the physics potential of Run 2.



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- The next 3 days will be full of interesting talks

- ◆ “This lineup is awesome, Joey.”

T. Stelzer

- Enjoy the workshop

- ◆ in person

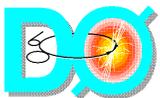
- ◆ by live streaming

- Thanks to:

- ◆ Fermilab (especially Barb Perington and Liz May)

- ◆ Michigan State University (especially Harry Weerts)

- ◆ your registration fees



# Panel Discussion Questions

- One of the key questions for this (and other) workshops:
  - ◆ Where do the off-the-shelf Monte Carlo programs not provide an adequate description of the data?
- Two different philosophies for extensions to predictions outlined in previous talks:
  - ◆ Matrix element corrections to Monte Carlos
  - ◆ Monte Carlo corrections to matrix elements
- Are they complementary/overlapping approaches?
  - ◆ Regions of particular applicability for one with respect to the other
- How important/timely is the extension to NLO?
  - ◆ To what extent are K-factors enough?
  - ◆ Can the K-factors be taken from the data (in regions of no new physics)?
  - ◆ Do we need a Manhattan-style project to carry out the needed calculations to NLO?

