

Why Conferences?



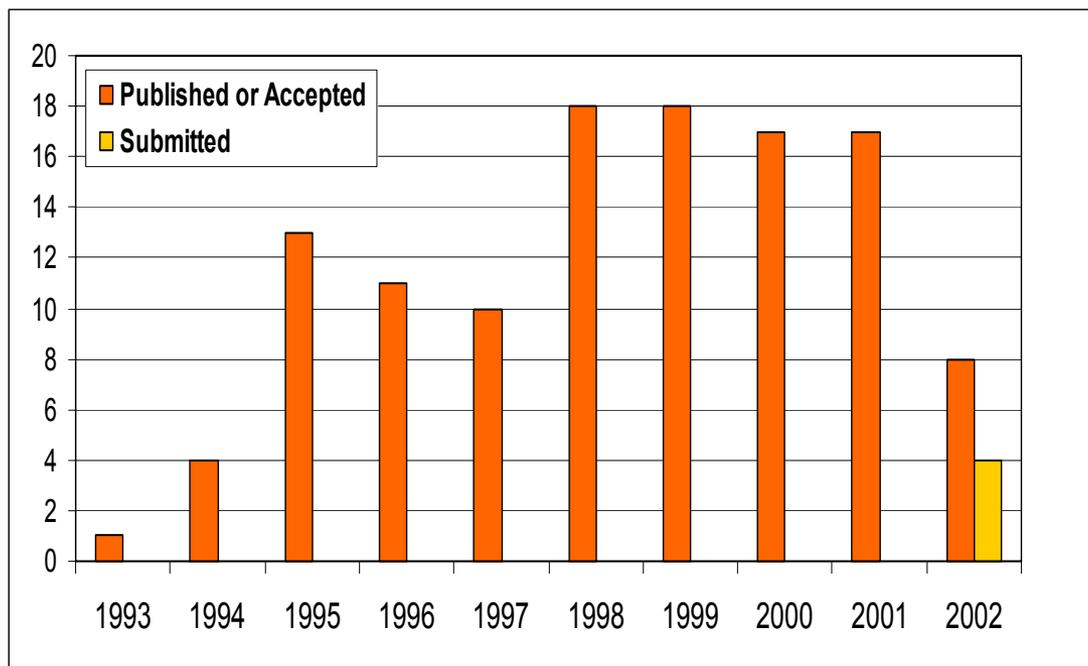
- Internal/Us:
 - Anchor schedule, hard deadlines
 - The only way to measure success for the entire system (many individual efforts not explicitly mentioned in doc)
 - Generate excitement → work, new ideas
 - Grad-students need to graduate
 - New jobs, promotions
 - Continuous feedback → prioritize work
 - Educational
- The bigger picture:
 - DØ's image impacts:
 - ◆ Level of support by funding agencies and institutions
 - ◆ Jobs, promotions
 - ◆ Run IIB funding
 - ◆ Conference talks, visibility
 - Fermilab and its users community can use positive PR

Run I is still productive



Jianming's Report

- DØ has published (or submitted) 121 papers so far

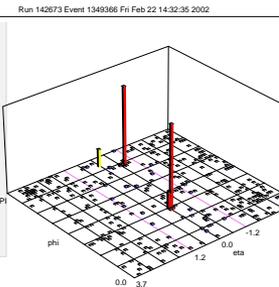
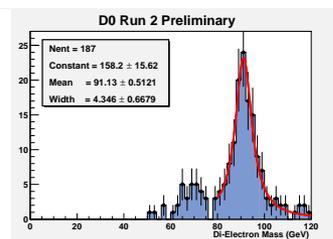
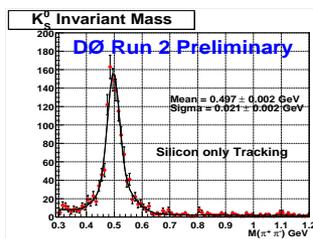
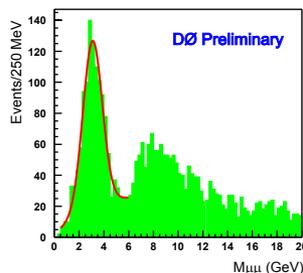
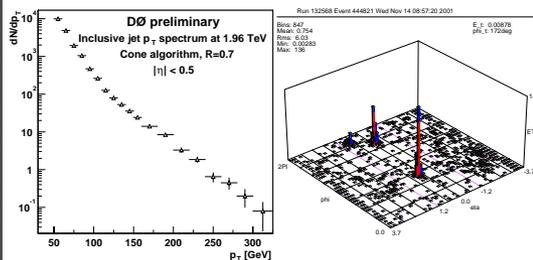


- ~5 more papers are expected to be submitted (soon?)
- We are showing Run I results at conferences



What have we shown so far?

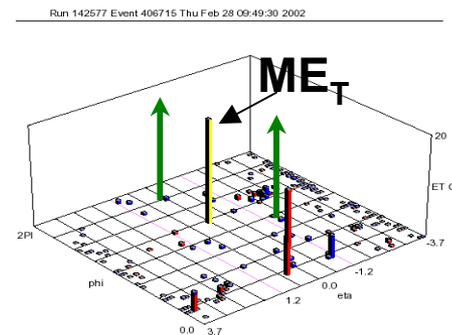
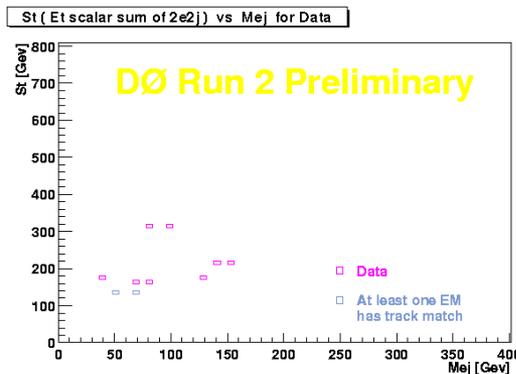
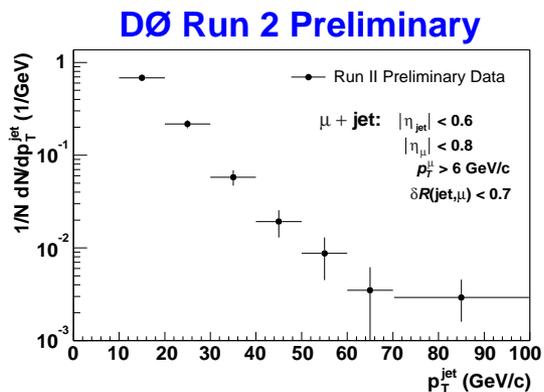
Moriond (Les Arcs, Mar. '02)



QCD (jets)

$J/\psi \rightarrow \mu^+\mu^-$ $K_S \rightarrow \pi^+\pi^-$

$Z \rightarrow e^+e^-$



$\mu + \text{Jets}$

LQ search

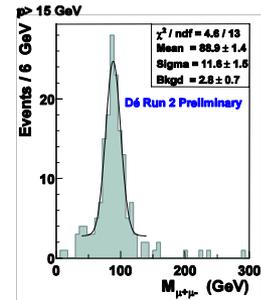
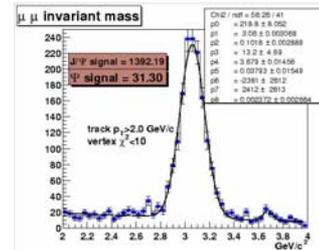
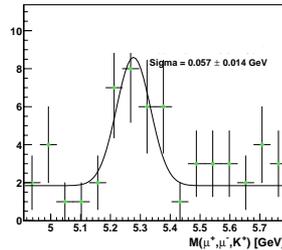
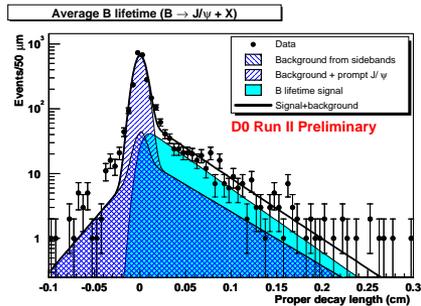
$e\mu$ candidate

First indications - ready to do physics



What have we shown so far?

ICHEP (Amsterdam, July '02)

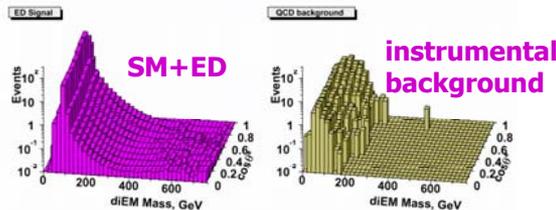
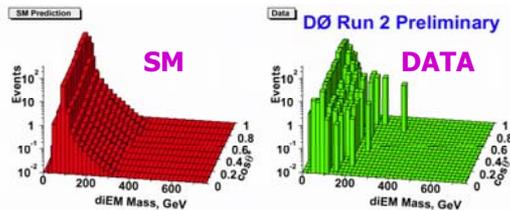


Identify b quarks

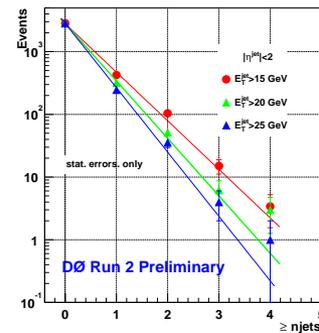
$B^+ \rightarrow J/\psi K^+$

J/ψ and ψ'

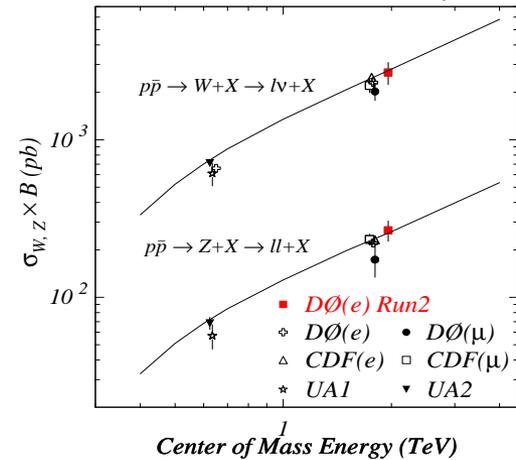
$Z \rightarrow \mu\mu$



$W \rightarrow e\nu + \text{jets}$



DØ Run2 Preliminary



$M_s(\text{GRW}) > 0.92 \text{ TeV} (ee, \gamma\gamma)$

First physics results at 2TeV

$$R = \frac{\sigma_W \times B(W \rightarrow e\nu)}{\sigma_Z \times B(Z \rightarrow ee)} = 10.0 \pm 0.8_{\text{stat}} \pm 1.3_{\text{syst}}$$

Godparents for Object Id



- Thanks to the retiring godparents: Jean-Francois Grivaz, Stefan Soldner-Rembold, Tom Ferbel, and Mitch Wayne

They did a fantastic job – very useful!

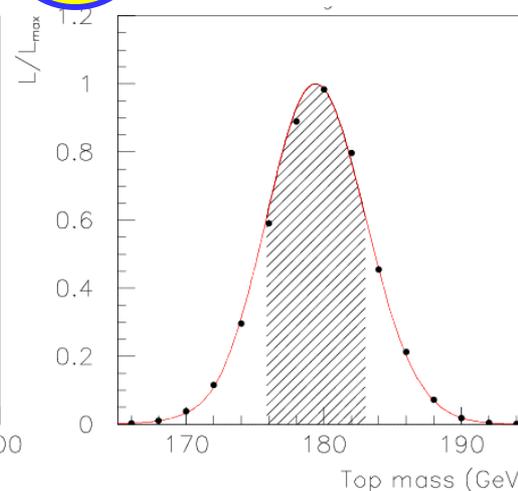
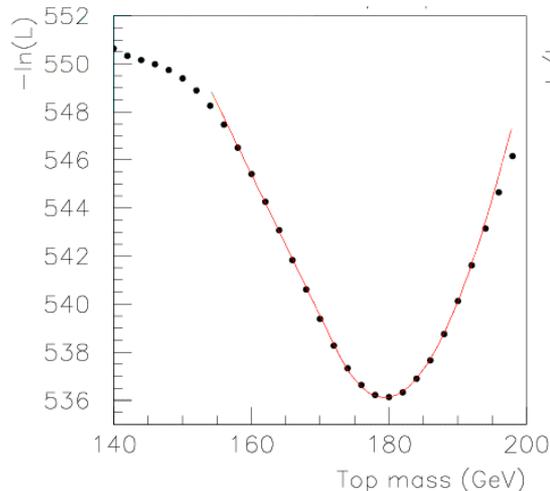
- Thanks to those willing to continue
- The new set of godparents are:
 - **EM ID – Ron Madaras**
 - **Jets/MEt ID – Bob Kehoe**
 - **Jet Energy Scale ID – Sarah Eno and Daniel Elvira**
 - **Muon ID – Peter Ratoff**
 - **B ID – Mark Strovink**
 - **Luminosity ID – Paul Slattery**
 - **Tau ID – Arthur Maciel**
 - **Forward Proton ID – Petros Rapidis**

Certified Id's for p11 by the end of October 2002

New Results

- Top quark mass in lepton + jets channel using a method similar to the one used to measure it in the dilepton channel
 - Each event has its own probability distribution
 - The probability depends on (almost) all measured quantities
 - Each event's contribution depends on how well it is measured

$$M_t = 179.9 \pm 3.6 \pm 6.0 \text{ GeV}$$



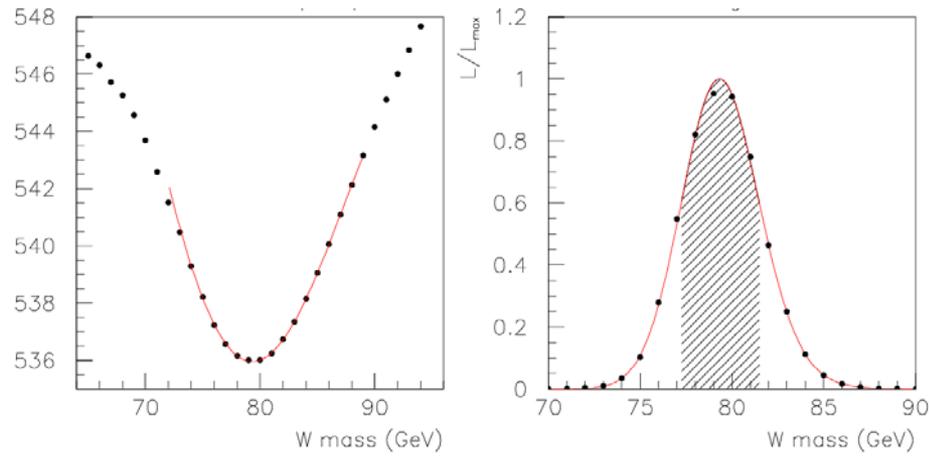
Was 5.6 GeV
in publication

- Improvement in statistical error is equivalent to running the Tevatron for two more years... (**conclusion - be efficient and be smart!**)

HCP – Top Physics (Run I)



- M_w can be measured in the same events where M_t is measured!

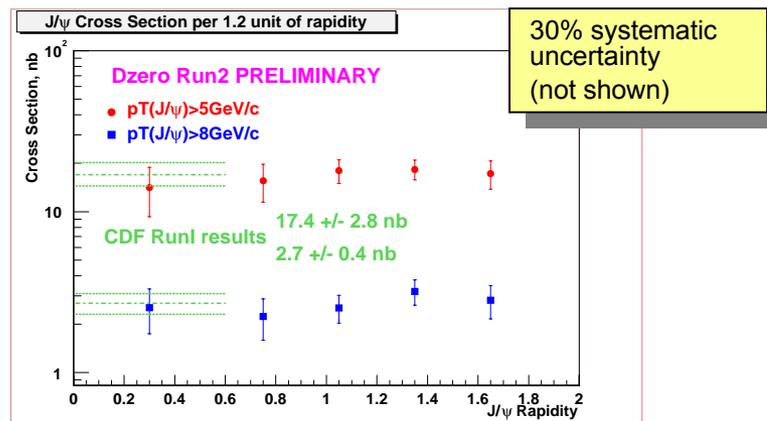
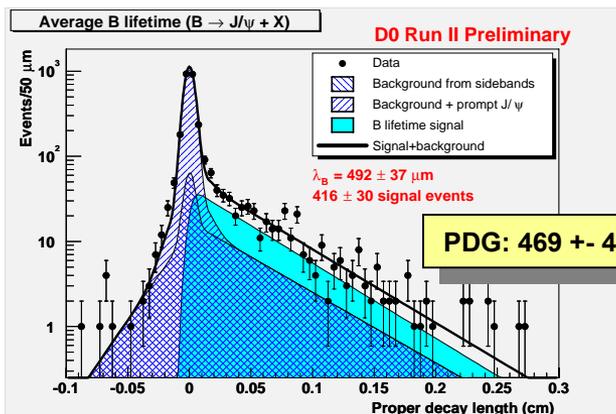
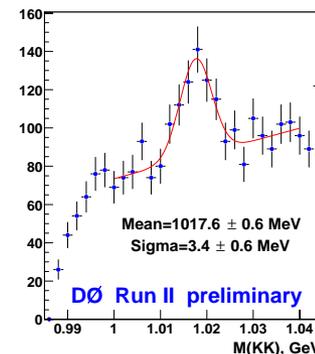
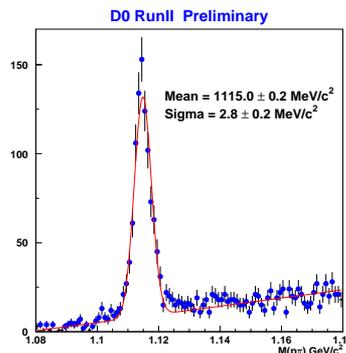


- Might be used for reducing the uncertainty in the jet energy scale (JES), which is the single most dominant systematic one (6 \rightarrow 3-4 GeV?)

HCP – B Physics (Run II)

New Results (Rick's ADM talk)

- We see Λ_s and Φ_s
 - Ready to look for:
 - $\Lambda_b \rightarrow J/\psi + \Lambda$
 - $B_s \rightarrow J/\psi + \Phi$
- B quark lifetime and J/ψ production cross section



Nice agreement with PDG and

with CDF (Run I)

DØ's first "real" B physics analysis (Run 1 was really all QCD) (Rick Jesik, ADM)

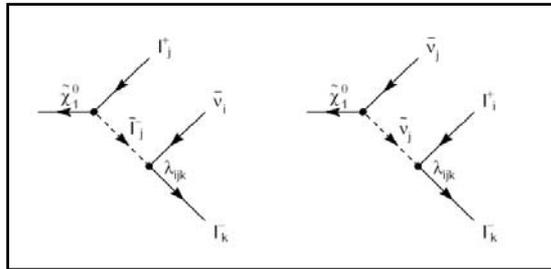
HCP – NP Physics (Run II)



New Results (Daniel's ADM talk)

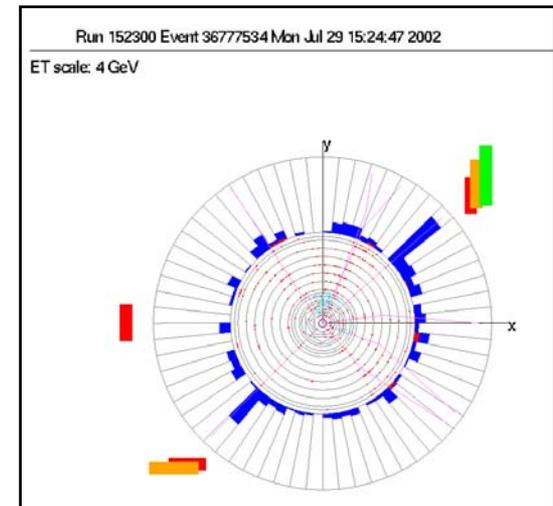
Tri-lepton search (SUSY)

(Improved estimate of backgrounds)



	eee	$ee\mu$
<i>SM Background</i>	0.9 +- 0.2	0.13 +- 0.08
<i>EM Fakes</i>	1.0 +- 0.3	0.6 +- 0.2
<i>Cosmics</i>	---	0.145 +- 0.014
Total	1.9 +- 0.4	0.9 +- 0.2
Data	2	1

$Z \rightarrow \mu\mu$ with Cal MIPs (MTC)



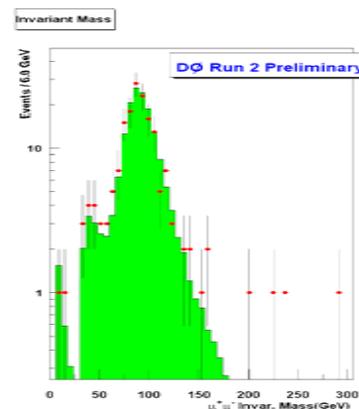
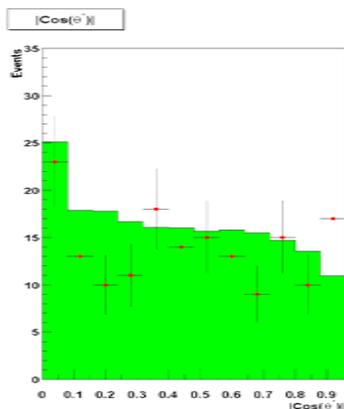
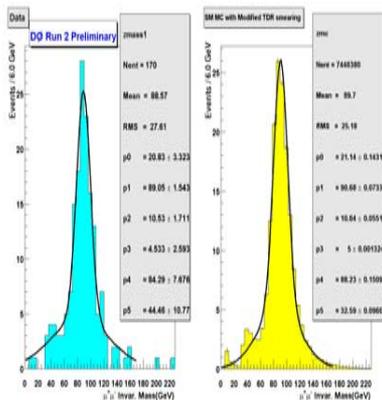
Find extra Zs

(cal track & no local muon)

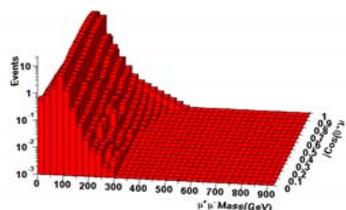
Additional Z efficiency: 24.7%
Additional μ efficiency: 14.8%

HCP – NP Physics (Run II)

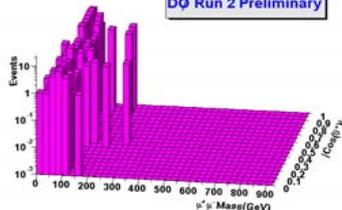
New Results (Ryan's ADM talk)



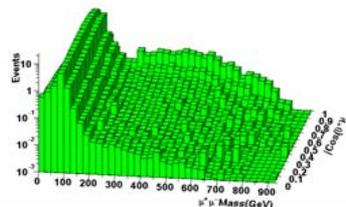
MC: Standard Model



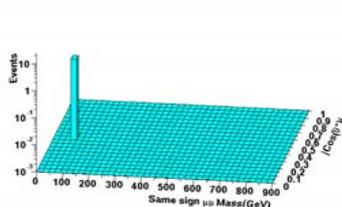
Data



SM + ED terms ($\eta_G=15.0$)



Data: Same Sign Background



Large Extra Dimensions search in Di-Muons: (First result from a hadron collider!)

- $\eta_G = (7.8 \pm 4.7) \text{ TeV}^{-4}$
- 1.6σ from background
- Limit: $\eta_{95\%} < 15.1 \text{ TeV}^{-4}$

Initial physics results from Run II

Editorial Boards for Run II Analyses



- We formed 4 EBs to help us reviewing Run II analyses for ICHEP (July '02) and HCP (Sept. '02)
- Very first time we scrutinized Run II analyses at this level
- These EBs are done now

They did a great job - extremely helpful!

- Thanks to:
 - NP - [Paul Grannis](#) (chair), Dave Hedin, Elemer Nagy, Peter Ratoff, and Andre Turcot
 - B - [Andrzej Zieminski](#) (chair), [Rick Jesik](#) (deputy chair), Alice Bean, Leslie Groer, and Yuri Yatsunenko
 - WZ - [Terry Wyatt](#) (chair), B.S. Acharya, Chip Brock, Harry Melanson, and Armand Zylbersteijn
 - Higgs - [Herb Greenlee](#) (chair), Drew Baden, Karl Jakobs, Rich Partridge, and Bing Zhou

Next set of EBs will be formed closer to the Run I model



Aggressive Wish List

- Top Physics ([Ela's talk](#))
 - Measure $t\bar{t}$ production cross section at $E_{CM}=2$ TeV
 - Measure Top quark mass
 - Other top properties?
- W/Z/Higgs Physics
 - Measure inclusive W and Z production cross section
 - Measure W+jets and Z+ jets production cross sections (b-tag?)
 - Demonstrate production of W decaying to τ
- New Phenomena Searches
 - Determine limits on the production of particles generated by a variety of physics beyond the SM (SUSY, LQ, ED, etc.)



Goals for Moriond '03 (cont.)

- QCD Physics
 - Measure inclusive jet production cross section
 - Demonstrate diffractive physics ([Carlos' talk](#))
- B Physics
 - Measure b quark lifetime
 - Measure b production cross section
 - Demonstrate observation of different B meson exclusive decay modes

Remember, it's important to have a strong showing - there is future beyond Moriond (LP03, 2004, 2005,...)

The Overall Plan – Next Six Months



- Basic requirements (some more crucial than others):
 - Detector and Trigger work adequately ([Alan's talk](#))
 - Decent data-taking efficiency (>75% soon and increasing)
 - Highest priority triggers not prescaled ([Nikos' talk](#))
 - Data reconstructed as they are collected (<2 weeks)
 - Dataset of at least 50pb⁻¹ by the end of 2002
- More requirements:
 - Streaming available ([Adam's talk](#))
 - TARC recommendations implemented ([Valentin's talk](#))
 - Initial CTF recommendations implemented ([Marek's talk](#))
 - P13 ready for prime time early enough for reprocessing ([Jianming's talk](#))
 - Backlog eliminated in time ([Jianming's talk](#))
 - ...
 - Stability

The Overall Plan – Difficult Decisions



- We should keep the “right” balance between the need for results to be shown at conferences (+ feedback+ education+ excitement+...) and the need for making progress as fast as possible to get to the “big prize”

Hardware/Trigger/Software/Analysis

- Find the “optimal” timing for
 - Installation/commissioning/use of new trigger elements
 - Fixing hardware problems/glitches, optimizing performance
 - Trigger rates - L1/L2 accept rates (400/200→1000/500)
 - Streaming - when? how many streams? priorities
 - RECO - p11 vs p13 (vs p12)
 - Root-tuples vs TMBs (and products)
 - MC - p10 vs p11 vs p12 (Root-tuples?)

Good news for some may be bad news for others - please be patient!

Example - Streaming



- Streaming (online exclusive) is in our future!
 - People have been working on this (+docs) for years
 - Main reason - the need for reprocessing subset(s)
Newer RECO version, Better calibration & alignment, "Expensive" options
- The sooner the better - teething problems
 - Decision - start implementing with caution (simple - only 2 physics streams)

Can it be useful for testers AND for analyzers?

- Many unknowns in the overall schedule, e.g.
 - Readiness of p13 for prime time
 - Availability of farm nodes for reprocessing
- Plan - process all data as they are collected
 - Express stream (~10% @2E31) - may benefit from p13

We have to make sure that the tools to use the streams (db, SAM, luminosity,...) are ready and soon

Conclusions



- Still lots to do; many efforts going on in parallel (be patient!)
- Tremendous progress made in many areas over the last months
- Major accomplishments; seeds for promising future
- Discussions (sometimes heated) about priorities and tradeoffs (e.g. TB on Express) are very important - we begin to focus better on our main goals/physics
- We are seeing signals of all the physics we're interested in and we can measure cross sections, masses, limits, etc
- The next several months (and years!) are going to be very interesting to all of us

Let's get ready to produce significant Physics results in 2003. After all, this is the most exciting place for HEP research in the next 8 years or so