

CDF Run 2b

Nigel Lockyer
For the CDF Collaboration
Baseline readiness review
September 24, 2002

September 24, 2002

Nigel Lockyer
University of Pennsylvania and Fermilab



CDF Collaboration

North America



3 Natl. Labs
28 Universities



1 Universities

Totals

- 112 countries
- 58 institutions
- 581 physicists

Europe



1 Research Lab
6 Universities



1 University



4 Universities



2 Research Labs

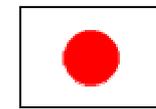


1 University

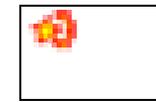


1 University

Asia



5 Universities
1 Research Lab

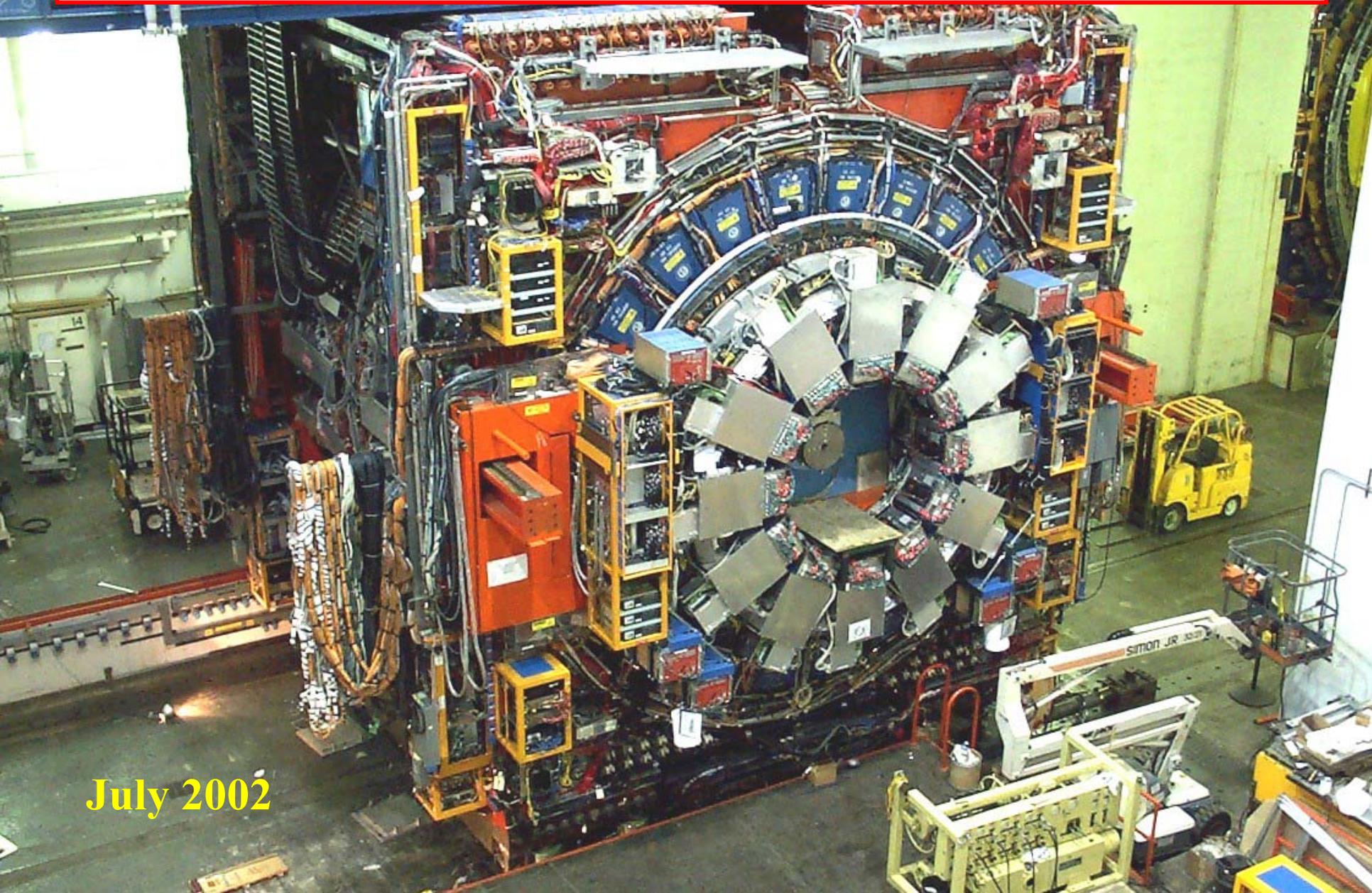


1 University



3 Universities

First CDF Run II Physics Results



July 2002



Outline

- Timeline
- Physics Opportunities
 - CDF Performance
 - The Process
- Collaboration Support



Why Run 2b

- Tevatron is the Energy Frontier
- LHC is the Future 2007+commissioning
- CDF @2005-well understood Instrument
- Unprecedented Detector Sensitivity
- CDF has unique and powerful tracking ability
- Tremendous opportunity for discovery



Physics Opportunities in 2b

- Explore the high energy frontier
 - Experiments will guide theory
- No clear paradigm for new physics
- SUSY, extra dimensions, leptoquarks.....
 - Drives detector Upgrades



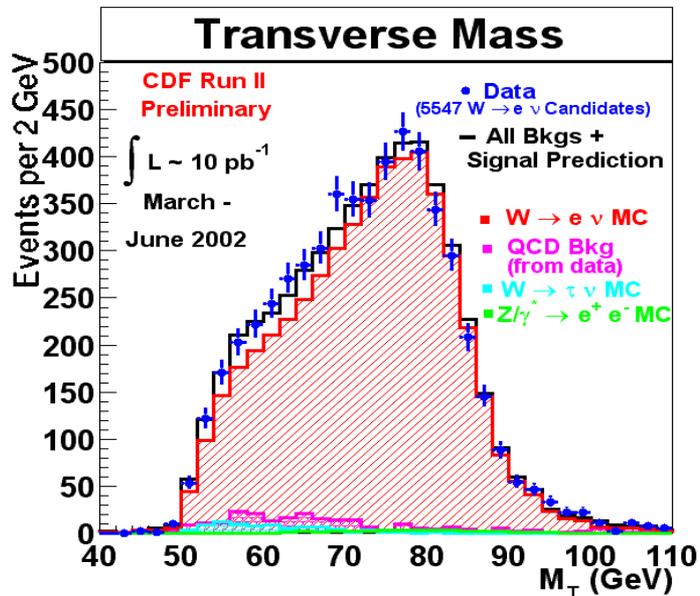
Opportunities in High Pt Physics for Run II

Anomalies in Run I data

1. Cross section at High Et Jet
2. Top Dilepton
3. $ee \gamma\gamma$ Missing E_T
4. $W+2$ jets



Measurements of $\sigma B(W \rightarrow e\nu, \mu\nu)$

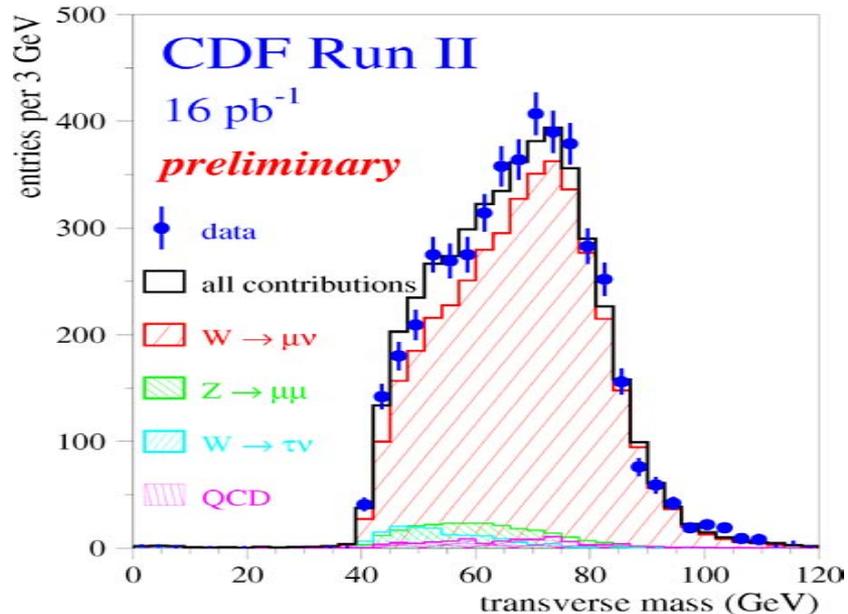


5547 candidates

$$\sigma_W \cdot \text{BR}(W \rightarrow e\nu) \text{ (nb)} =$$

$$2.60 \pm 0.07_{\text{stat}} \pm 0.11_{\text{syst}} \pm 0.26_{\text{lum}}$$

$$\text{Run 1 scaled to 1.96 TeV: } 2.72 \pm 0.02_{\text{stat}} \pm 0.09_{\text{syst}} \pm 0.10_{\text{lum}}$$



M_T

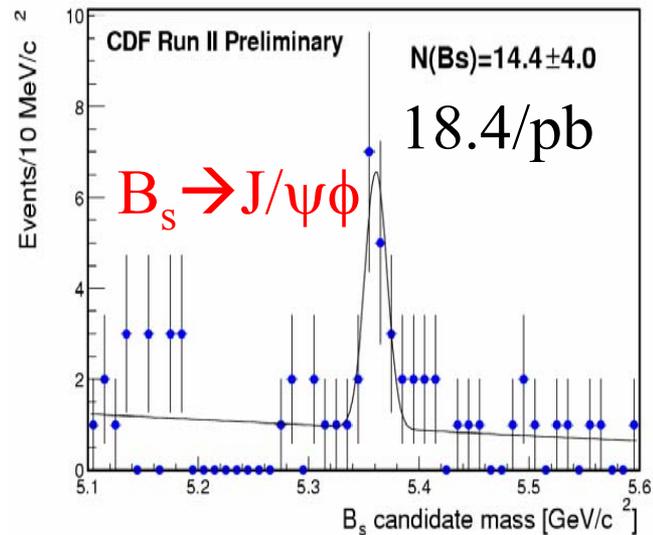
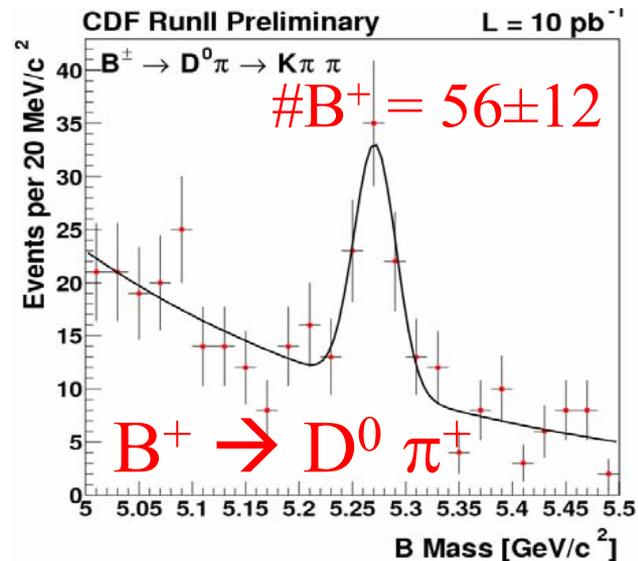
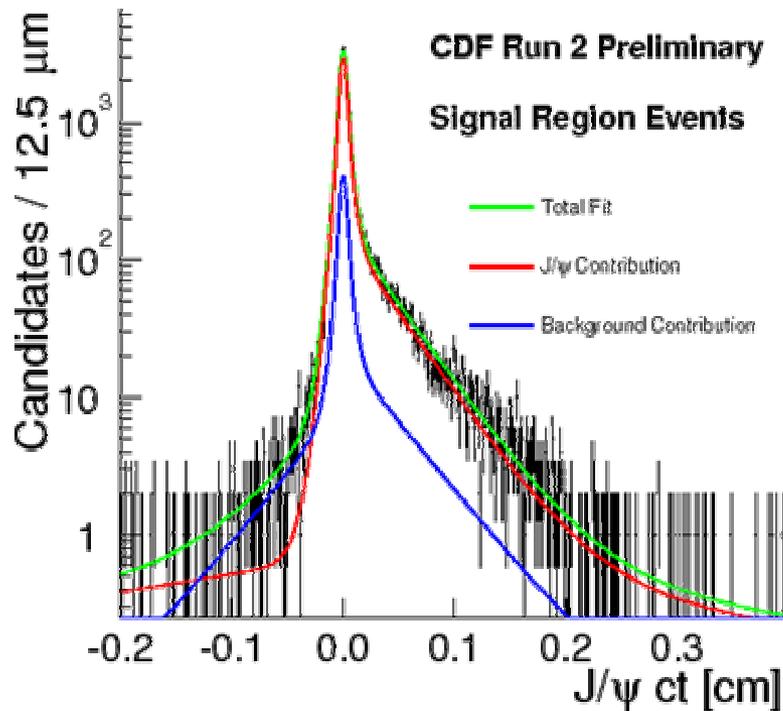
4561 candidates

$$\sigma \cdot B(W \rightarrow \mu\nu) =$$

$$2.70 \pm 0.04_{\text{stat}} \pm 0.19_{\text{syst}} \pm 0.27_{\text{lum}}$$



Toward B_s mixing using $B_s \rightarrow D_s \pi$



- Exclusive $B^+ \rightarrow J/\psi K^+$ lifetime

$$c\tau = 446 \pm 43_{\text{stat.}} \pm 13_{\text{syst.}} \mu\text{m} \text{ (PDG: } 502 \pm 5 \mu\text{m)}$$

- Inclusive B lifetime with J/ψ's

$$c\tau = 458 \pm 10_{\text{stat.}} \pm 11_{\text{syst.}} \mu\text{m} \text{ (PDG: } 469 \pm 4 \mu\text{m)}$$

September 24, 2002



Trigger/DAQ Upgrade

- Formed Task Force after last PAC
- Charge-answer PAC questions
- Document goes well beyond charge
- Huge effort underway for Run2a
- Conclude: targeted upgrades imperative for high mass physics program



Collaboration Support

- Preparing run2b MOUs
 - Very Strong non-US support for 2b
- Since LHC future—new interest from Europe
 - 60% US institutions committed to upgrade
 - All institutions committed to run2b



Summary

- High confidence in CDF detector
- Tremendous discovery potential in run2b
- Upgrades focused in critical areas only
- Collaboration will make run2b a success