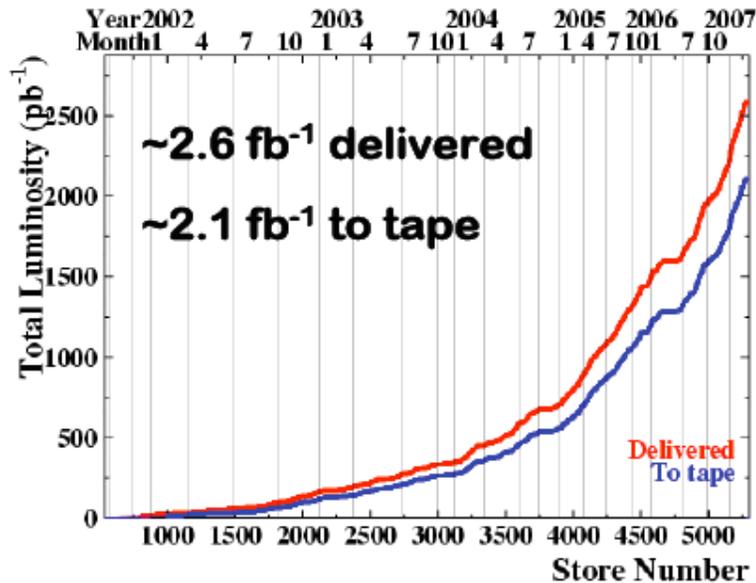


A painting depicting a rural scene. In the foreground, a person wearing a blue shirt and a dark hat is bent over, working in a field. To the right, another person in a red and black striped shirt and a dark hat stands holding a long staff or tool. In the background, a third person is visible, and a bird is flying in the sky. The overall style is somewhat abstract and expressive, with warm tones of brown, yellow, and red.

# Stato di CDF

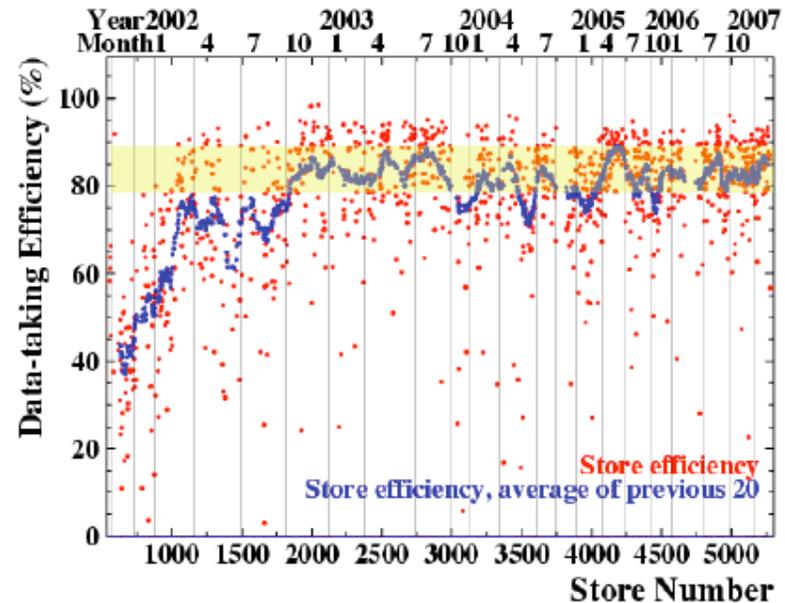
*Luciano Ristori*  
*7 Maggio 2007*

# Happily collecting data...



- Luminosity records:
  - Highest initial inst. lum
    - $\sim 2.92 \times 10^{32}$
  - Integrated lum/week
    - $43 \text{ pb}^{-1}$
  - Integrated lum/month
    - $165 \text{ pb}^{-1}$
  - Stacking rate
    - $23.1 \text{ mA/hr}$

Great success

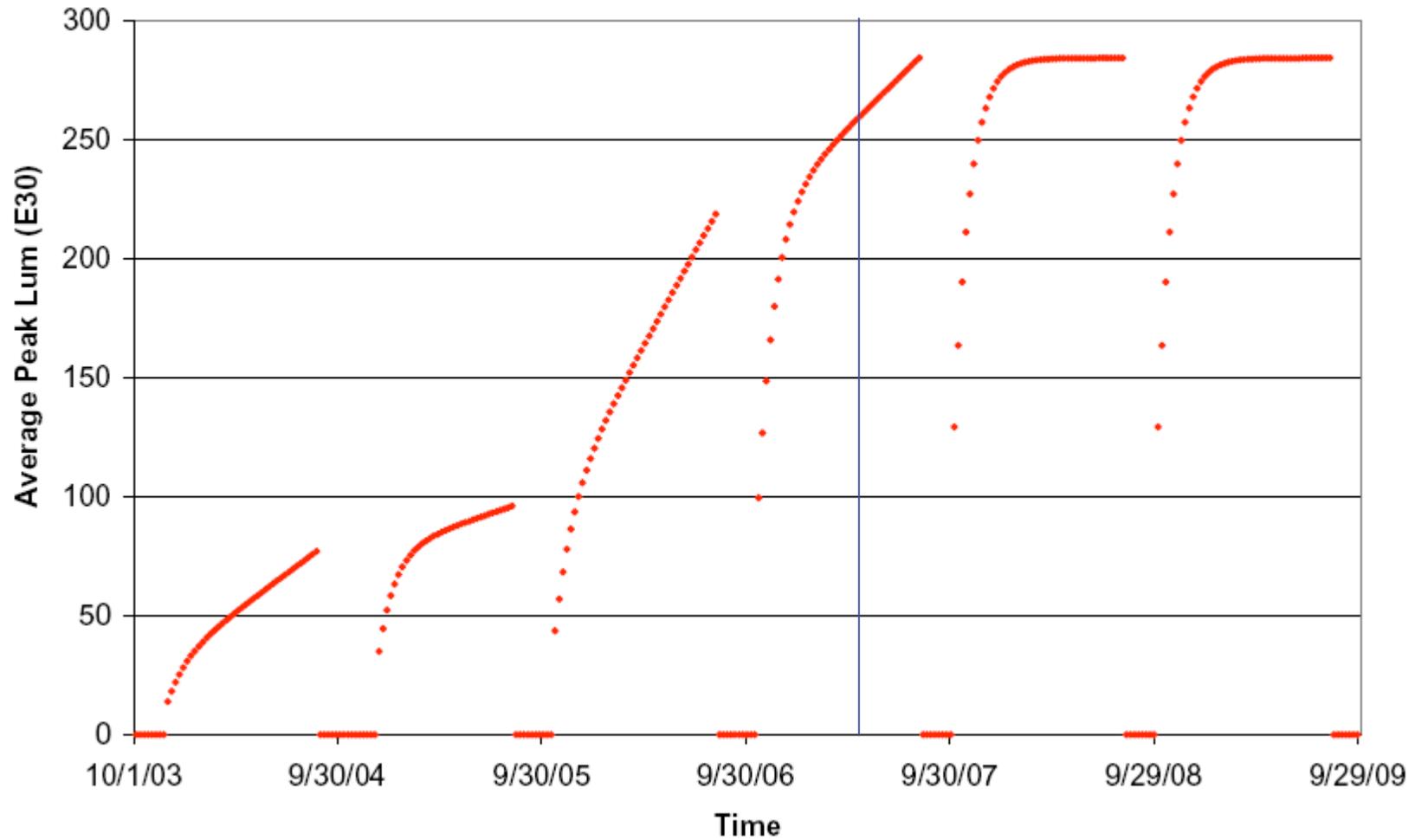


- Sources of inefficiency include:
  - Trigger dead time and readout  $\sim 5\%$ 
    - Intentional - to maximize physics to tape
  - Start and end of stores  $\sim 5\%$
  - Problems (detector, DAQ)  $\sim 5\%$

Stable

# Luminosity Projection

Average Peak Luminosity (E30) vs Time



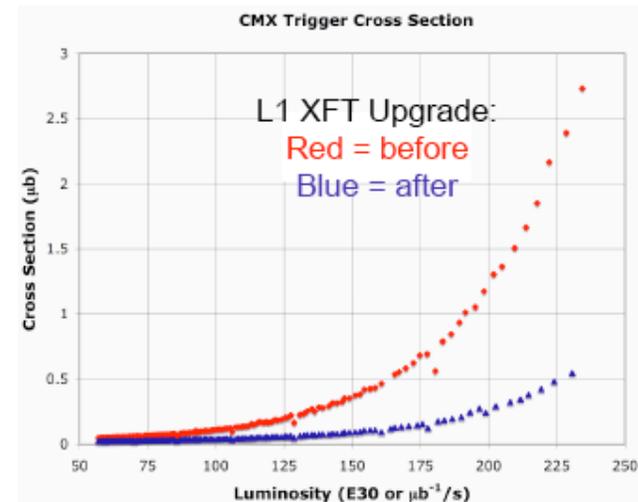
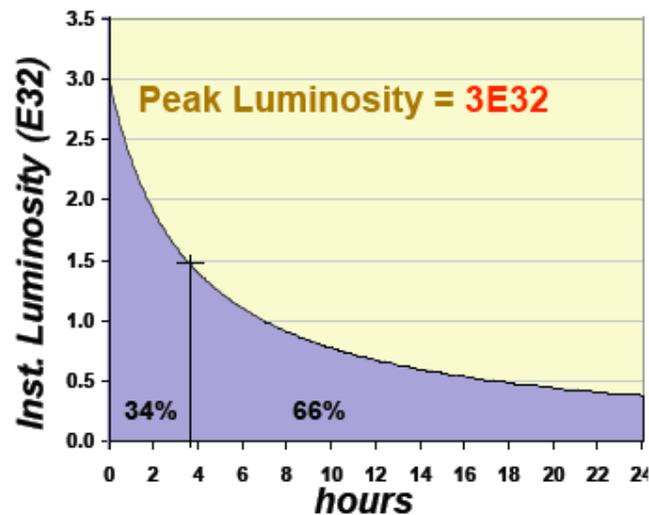
# Detector Status

- **Silicon longevity**
  - Expect silicon detector to last through 2009
- **Tracking chamber (COT)**
  - Aging not a problem, will be ok through 2009
- **High Luminosity running**
  - **Trigger**
    - Requires constant attention
    - Upgrades on tracking and calorimetry fronts
  - **DAQ**
    - Built more bandwidth

No showstopper foreseen through FY09

# Triggering at high luminosity

- Experience with luminosity at  $\sim 3e32$ 
  - Bulk of triggers [for Higgs] are fully functional to at least  $3e32$
  - Identified a few triggers with unacceptable rates
    - XFT and Cal upgrades to help deal with these
  - Using “dynamic prescaling” to optimize physics and bandwidth
    - High rate triggers have large prescale at high lum
    - Prescales relaxed as bandwidth becomes available at low lum
  - Most of the time is spent at below  $\sim 1.5e32$



No serious issue but continuous watch is needed

# Some Recent CDF Physics Results

- Observation of Bs mixing ( $\Delta m_s = 17.77 \pm 0.10 \text{ stat} \pm 0.07 \text{ sys ps}^{-1}$ )
- Observation of new baryon states ( $\Sigma_b$ )
- Improved Top mass precision ( $170.5 \pm 2.2 \text{ GeV}$ )
- WZ discovery ( $6\sigma$ )
- ZZ evidence ( $3\sigma$ )
- Precision W mass measurement ( $80.413 \pm 0.048 \text{ GeV}$ )
- W width measurement ( $2032 \pm 71 \text{ MeV}$ )
- B physics ( $\sigma$ , BR, direct CP violation)

# Published Papers

<b>Calendar Year</b>	<b>Publications</b>
<b>2003</b>	<b>4</b>
<b>2004</b>	<b>17</b>
<b>2005</b>	<b>44</b>
<b>2006</b>	<b>55</b>
<b>2007</b>	<b>11</b>
<b>Total to date</b>	<b>131*</b>

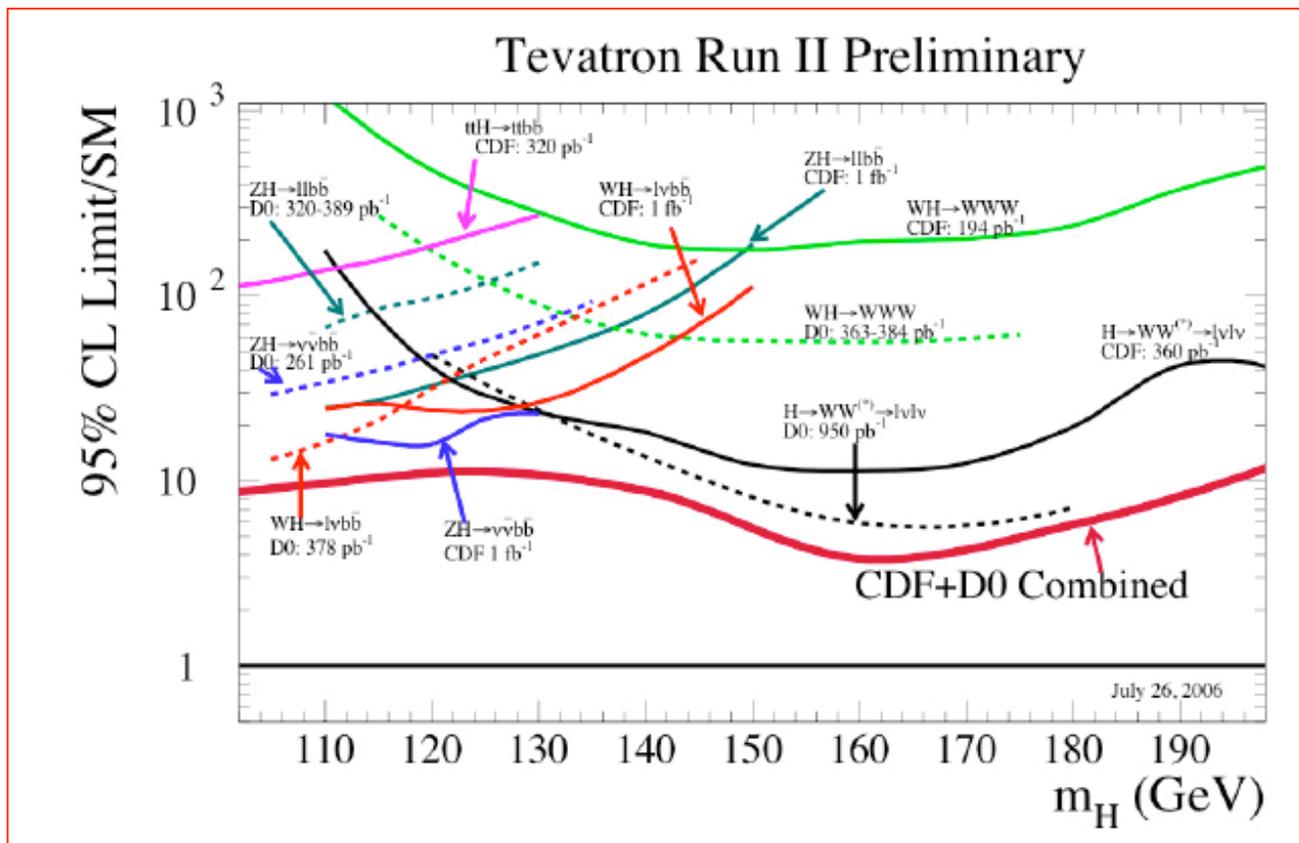
\* Include submitted+accepted+published

- We also have >50 additional papers under internal review !

**We are publishing our results as we go**

# Improving Higgs Sensitivity

- More integrated luminosity
- Improve trigger acceptance
  - L2 upgrade
  - Higgs Trigger Task Force
- Increase offline acceptance
- Refine analysis techniques
  - Improve b-tagging
  - Multivariate analyses
  - ...



Summer 06  
1 fb<sup>-1</sup>

# Consistenza della Collaborazione

	CY 2007	2008	2009
US FTE	222	162	127
Non US FTE	170	135	109
<b>Total US + Non US</b>	<b>392</b>	<b>297</b>	<b>236</b>
Post Doc's	101	73	53
Students	147	102	77

Collaboration members available in units of FTE

- ~30% more FTE in CY07 than estimated in CY05 !
  - Delay in LHC turn-on
  - Tevatron and CDF experiment running very well
  - Physics and leadership opportunities at CDF
- It takes ~100 FTE to Run CDF

64    61    58  
Projected INFN FTEs

19 INFN students

Enough people to run the experiment and accomplish the physics

# Gli studenti Italiani di CDF

- 9 tesi discusse negli ultimi 12 mesi
  - 6 tesi di Laurea
  - 3 tesi di Dottorato
- 19 tesi in corso
  - 10 Laureandi
  - 9 Dottorandi

Ved lista completa

<http://www-cdf.fnal.gov/physics/cdfita/2007-05-07/studenti.txt>

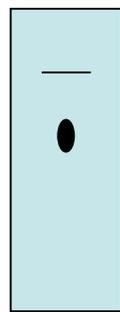
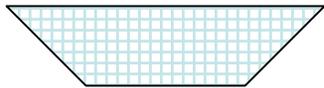
# Remote Shifts

## CDF control room in Fermilab



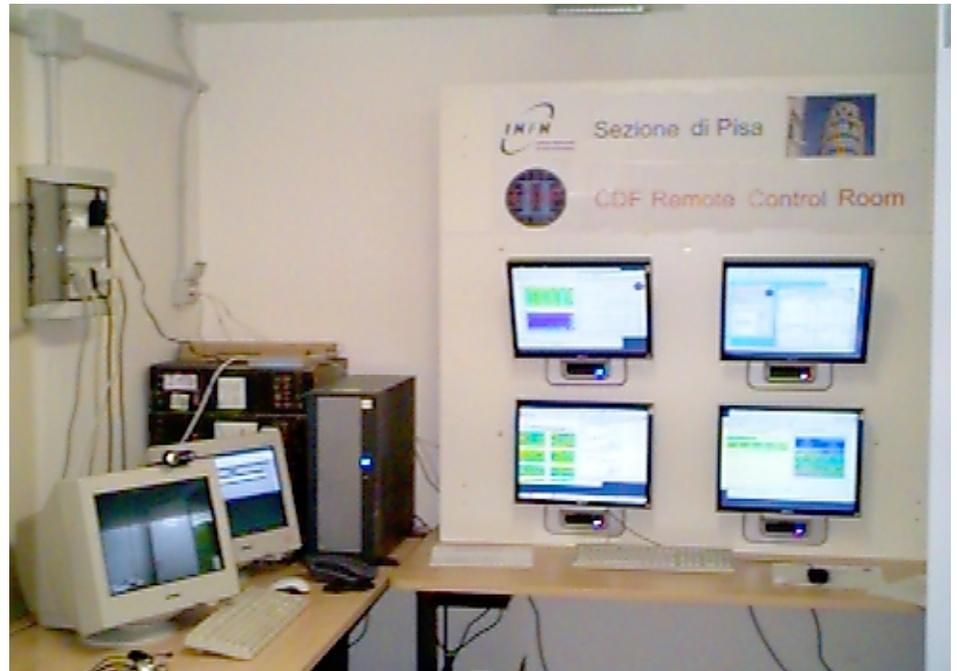
Echo suppression

Webcam (Polycom ViaVideo)

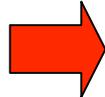


Desktop running Polycom PVX  
under Win XP – IP point-to-point  
connection

- Pioneered by Pisa
- Great success
- Now fully in operation
- More institutions are joining



## CDF control room in Pisa

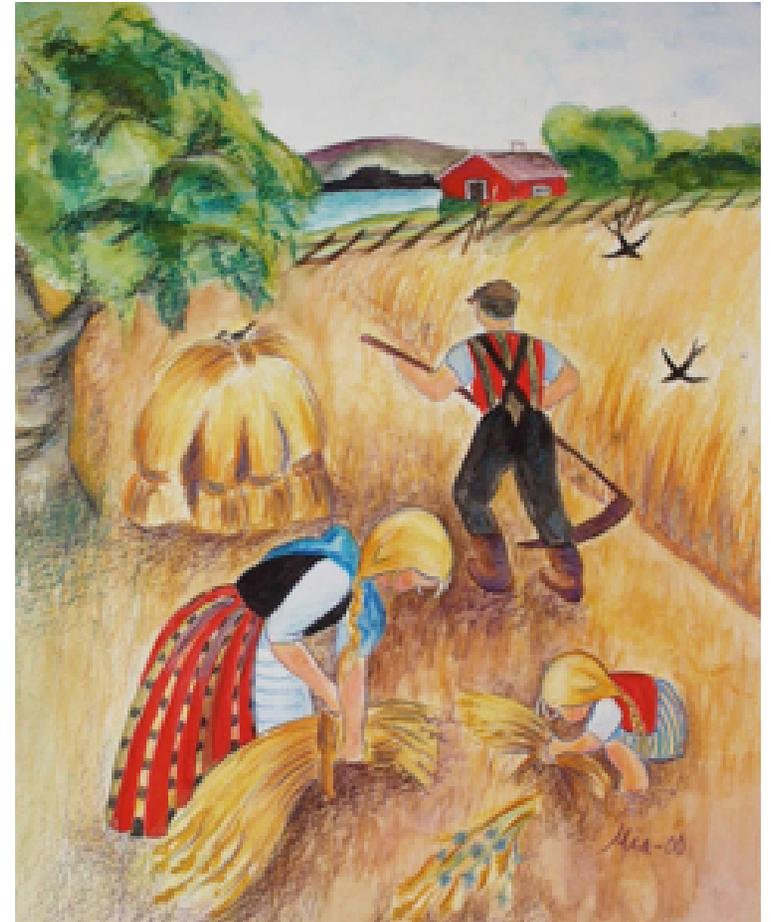


Pisa has contributed to development of  
the software needed to allow remote  
Consumer Operator shifts

# Riassunto

- *“The Tevatron and CDF are alive and well!”*
- Il gruppo italiano e' in prima linea sia nella analisi dei dati che nei continui miglioramenti al rivelatore necessari per affrontare le alte luminosita' ed estendere la sensibilita' di CDF a sezioni d'urto sempre piu' piccole
- L'Higgs SM non appare piu' una meta cosi' irraggiungibile

*“It's harvest time for CDF”*



*Harvest Time* by Mirja Clement