Latest results from Run 2 at DØ

Last updated – Oct. 23, 2001

John Womersley, Boaz Klima

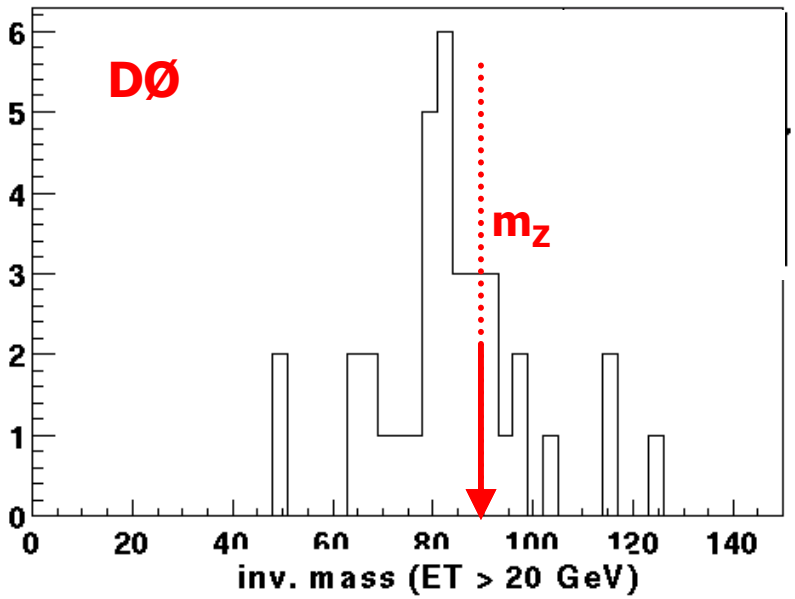
(womersley@fnal.gov,klima@fnal.gov)

Commissioning timeline

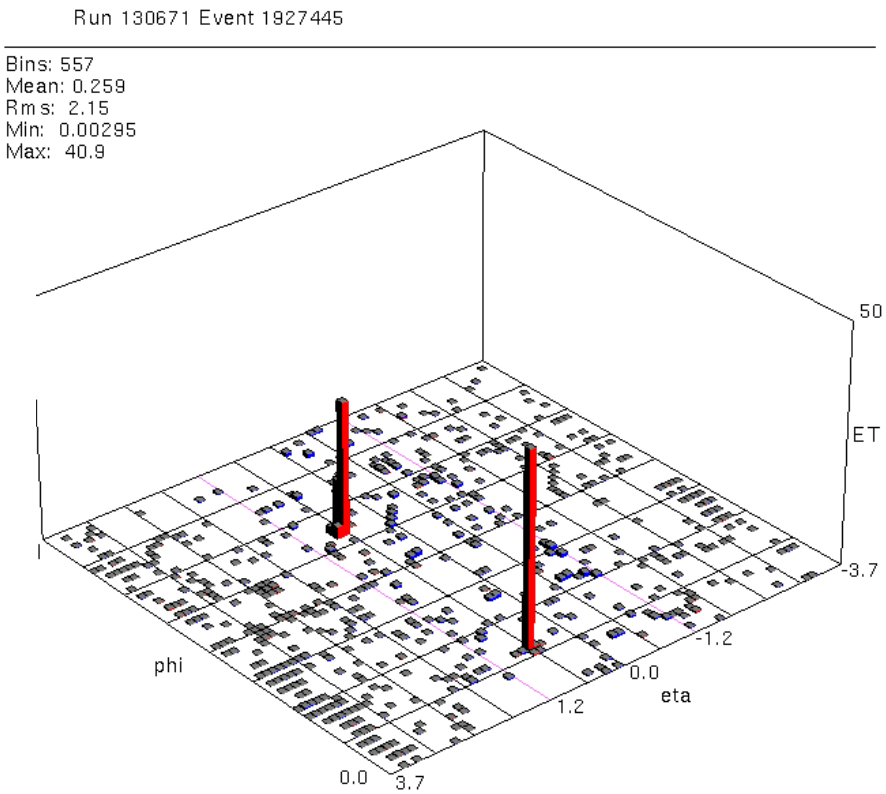
Dates	Action
~ July 26	Continue 36 x 36 running With detector as described before. **Done**
By August 15	• Increase L3 rate from 4 Hz to ~100Hz **Done** • Complete L1 Cal **In Progress** • Start bringing up L2 trigger partially **Done**
Run until ~ Oct 8	Take data & commission Offline software **Done** with real data; Calibration & Alignment **In Progress**
Oct 8 - Nov 16 **NOW**	Install AFE8 boards & other completion **In Progress**
November	36x36 stores Commission CFT & L1 track trigger
December & January 2002	36x36 fine tune & stabilize; → stable operation

Z → ee candidates

2 EM objects, E_T > 20 GeV, isolation and shower shape cuts

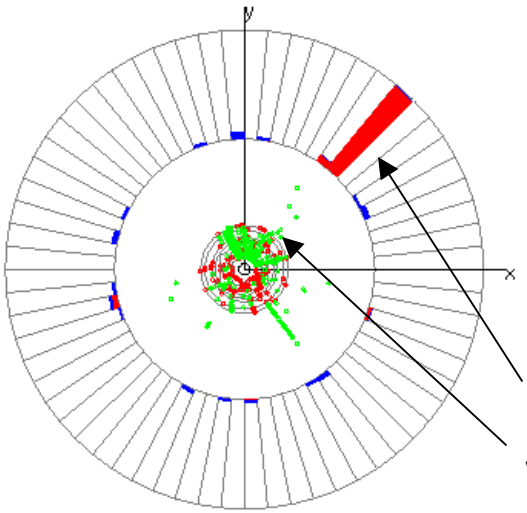


(uncalibrated energy scale)

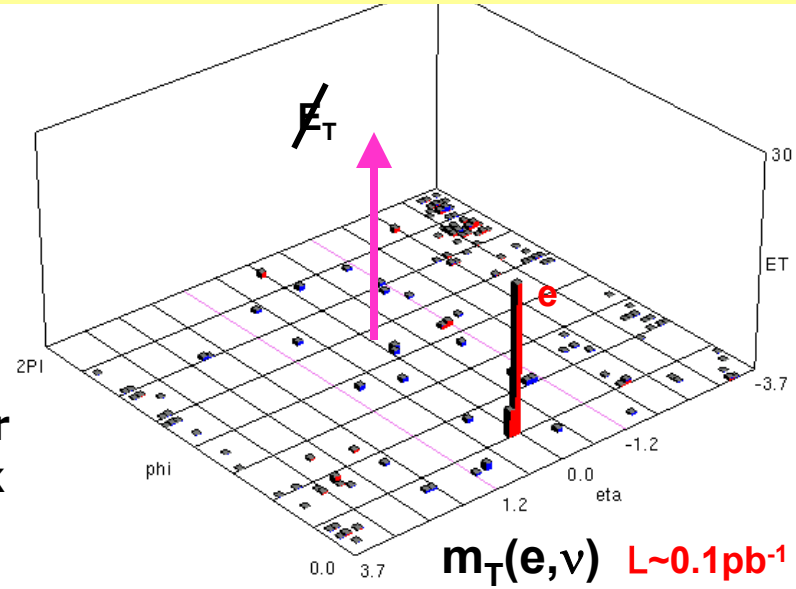


Leo Chan, Rochester

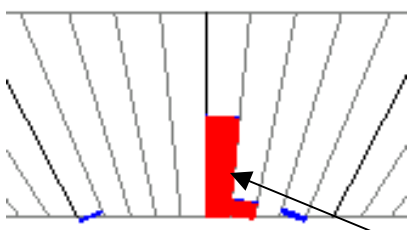
W→ eν candidates



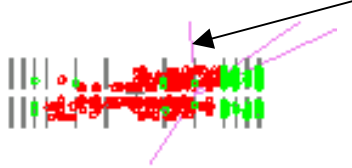
EM cluster with track

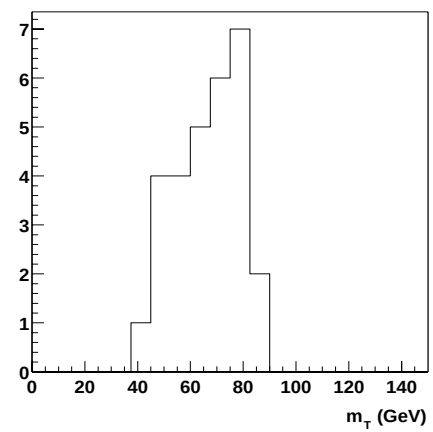


$m_T(e,\nu)$ L~0.1pb^{-1}



EM cluster with track

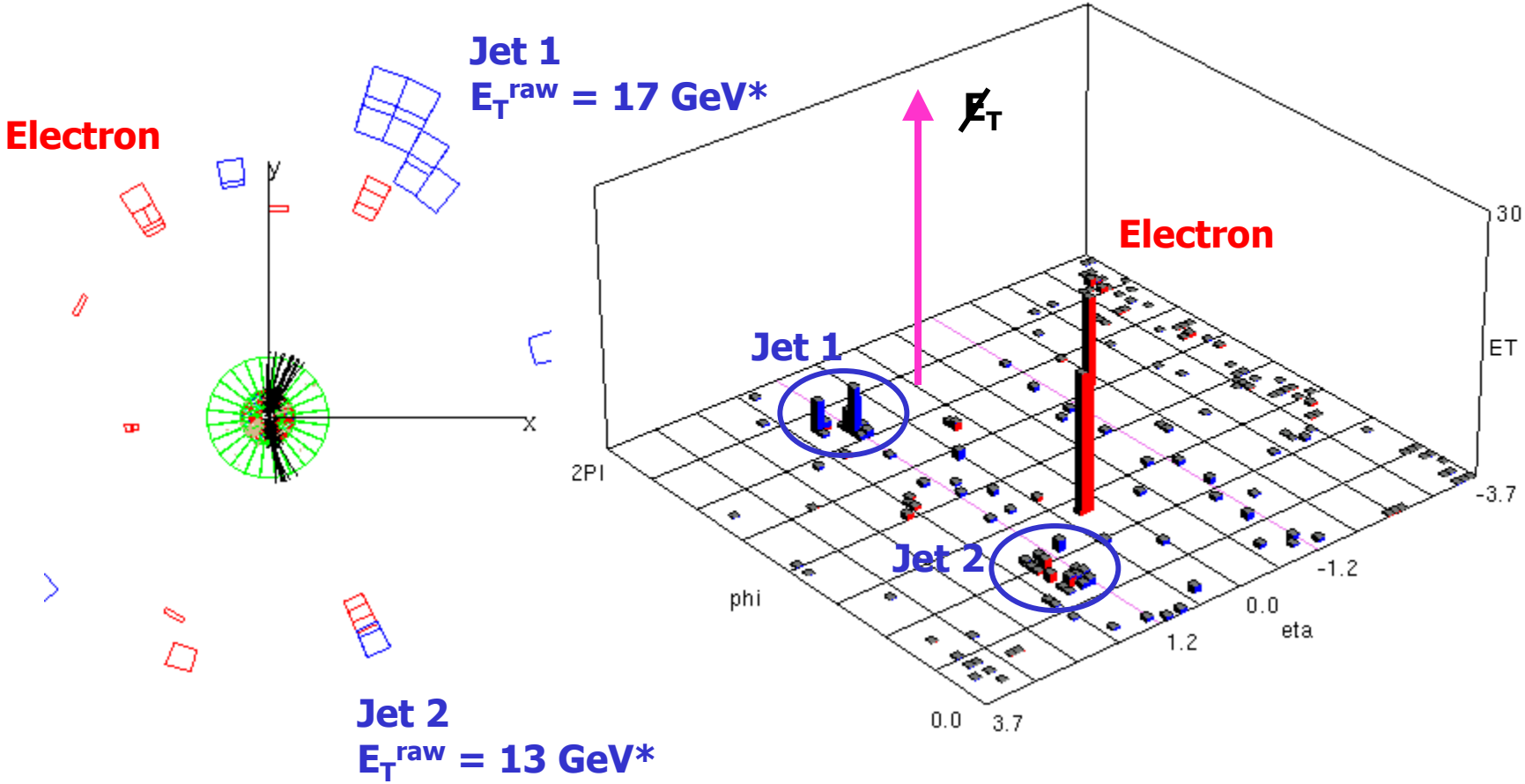




Vishnu Zutshi
Brookhaven

Just for fun . . .

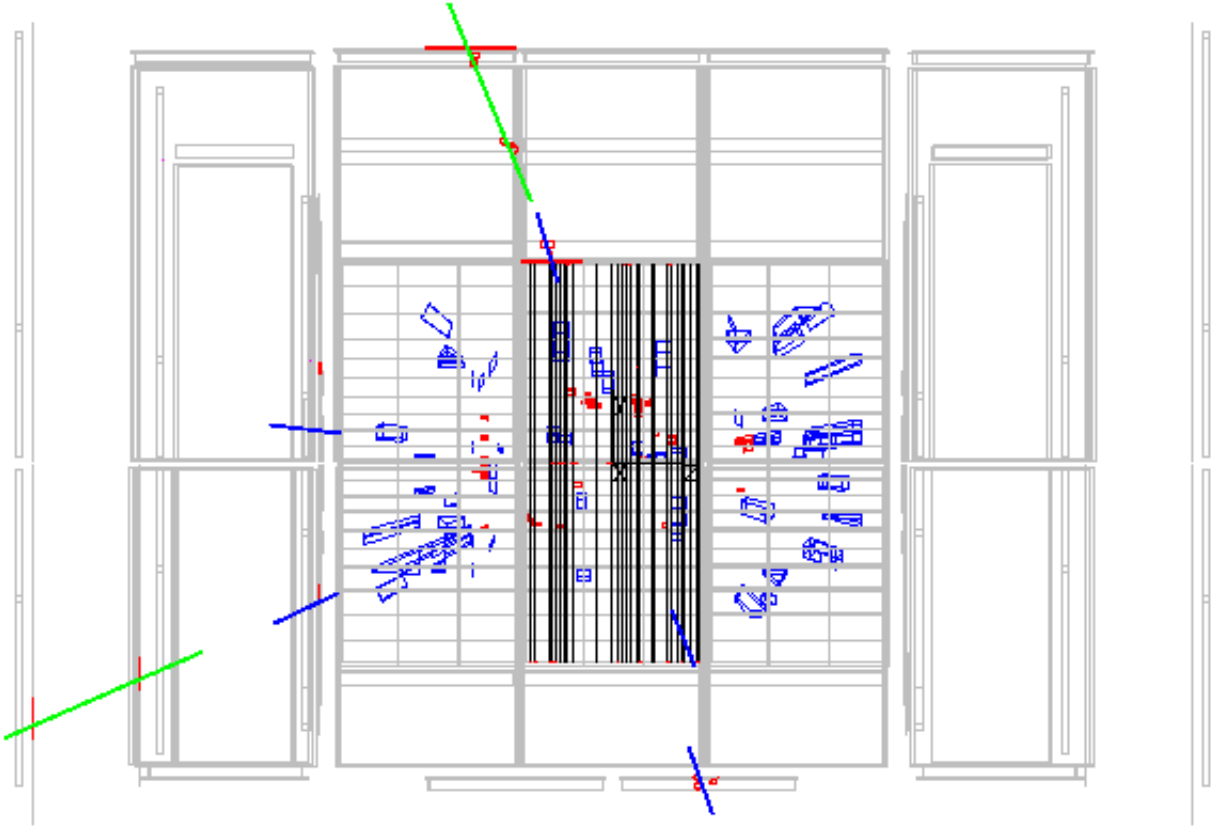
DØ W + 2 jet (Higgs!) candidate, October 2001



*** Jet E_T corrections will be large**

Di-muon Z candidate

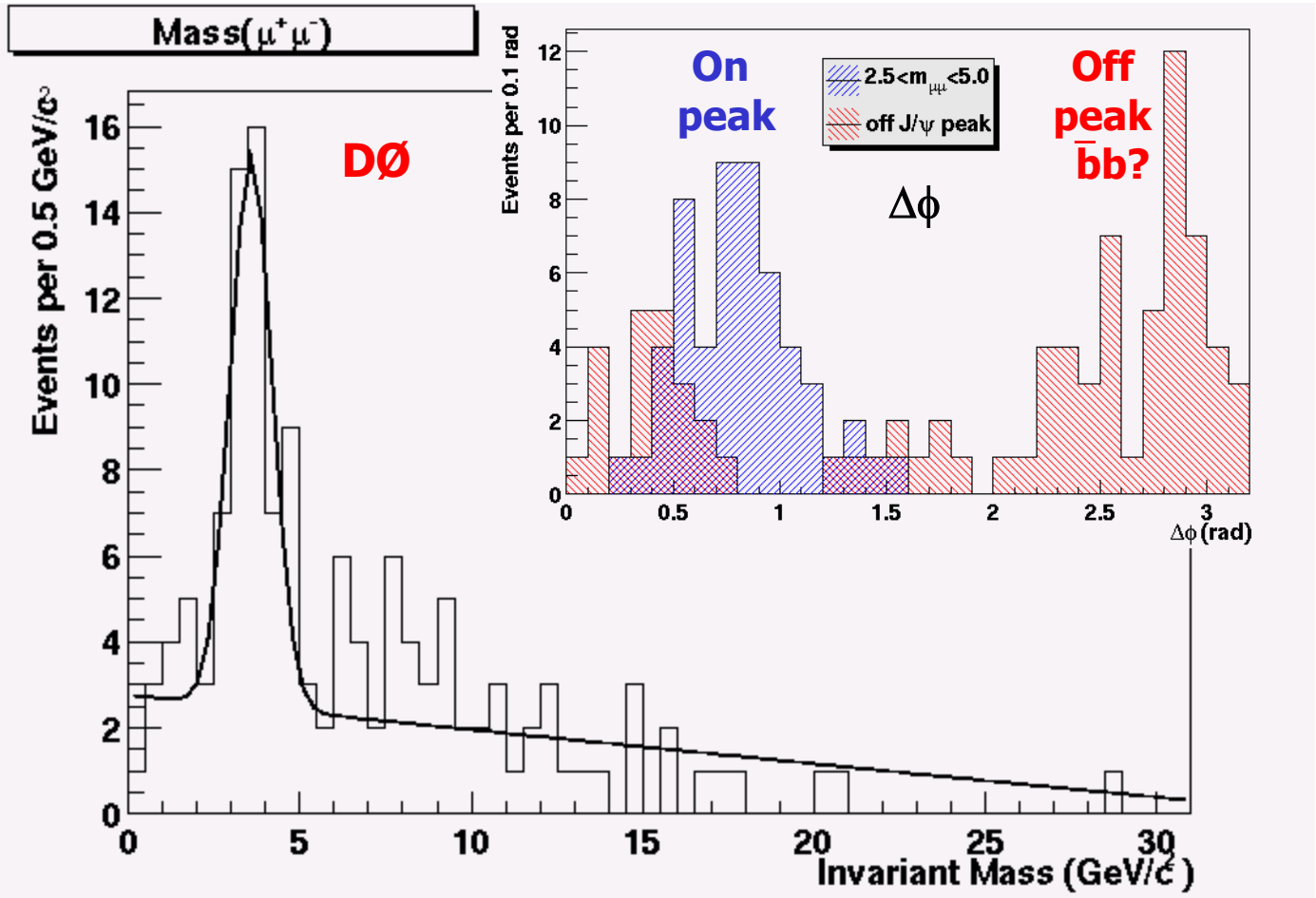
- Two muons recoiling against a jet
- Dimuon mass = 55 GeV (large error)



Onne Peters
NIKHEF

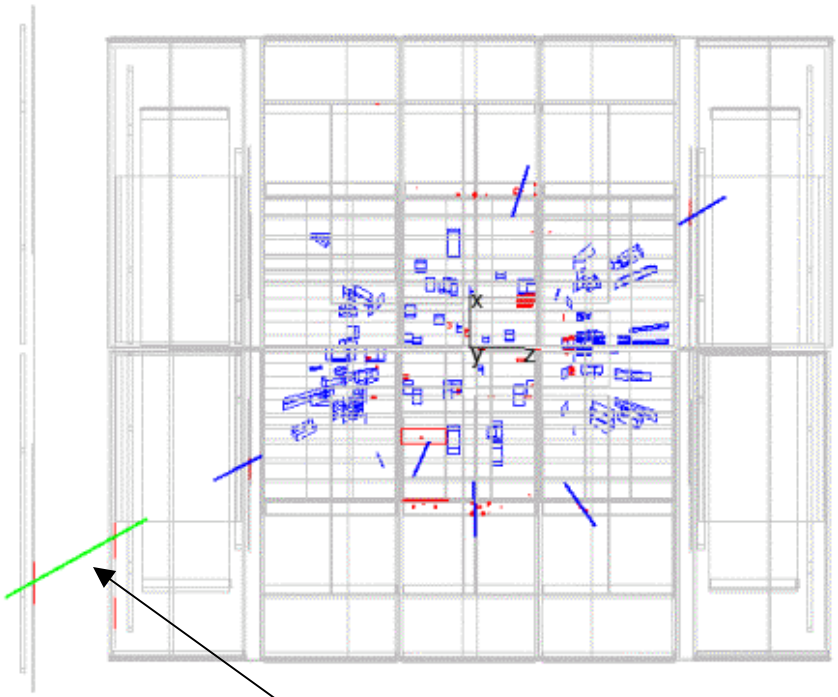
$J/\psi \rightarrow \mu^+\mu^-$ candidates

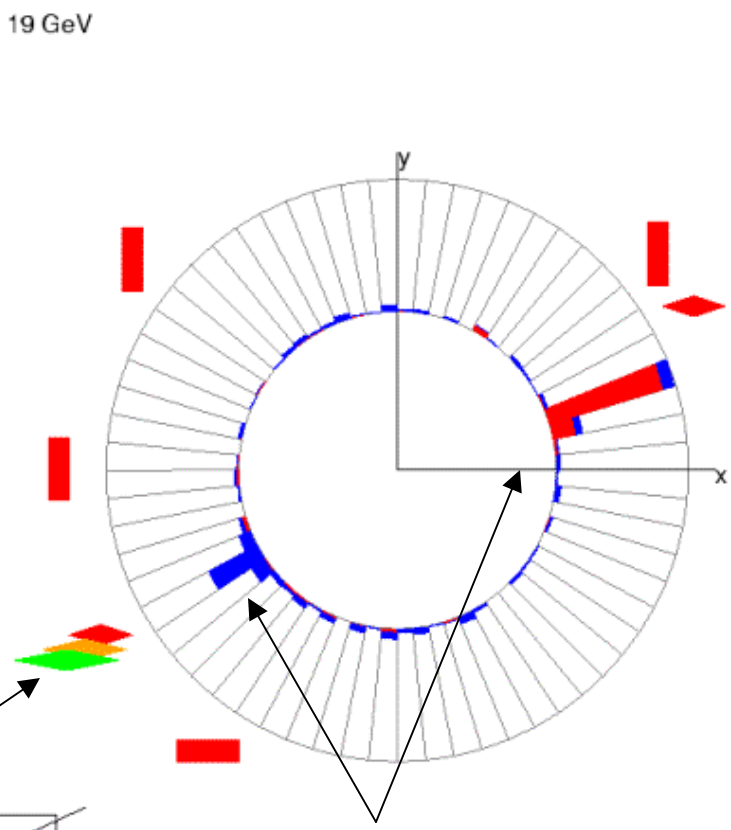
Di-muons reconstructed in the forward region



Muons in jets

Onne Peters, NIKHEF

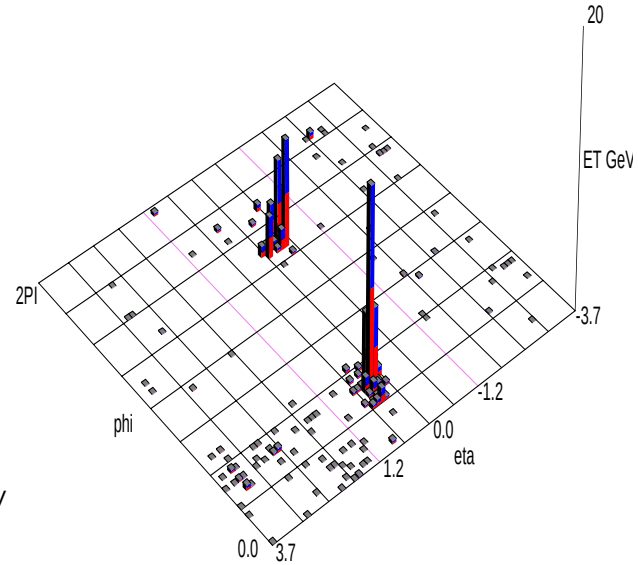




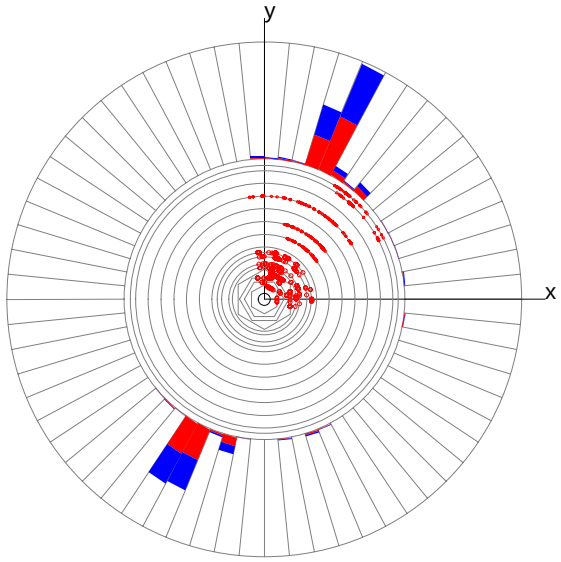
Muon in jet (b candidate)
Hits in A,B,C layers

Back to back
calorimeter jets

Jets



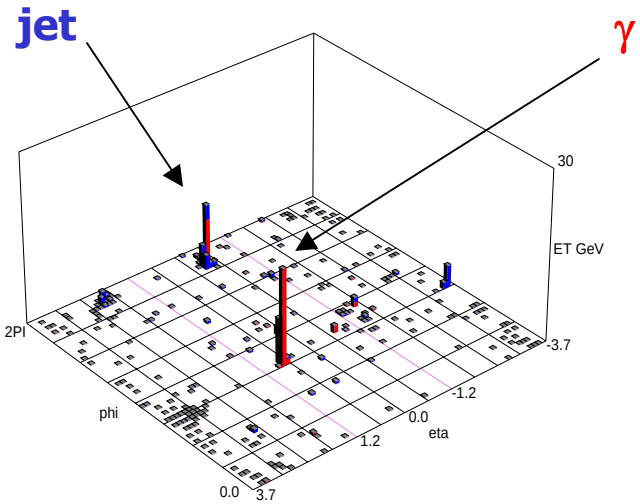
ET scale: 22 GeV
Eta cut: -1.5, 1.5



DØ

Gamma + Jet Candidate

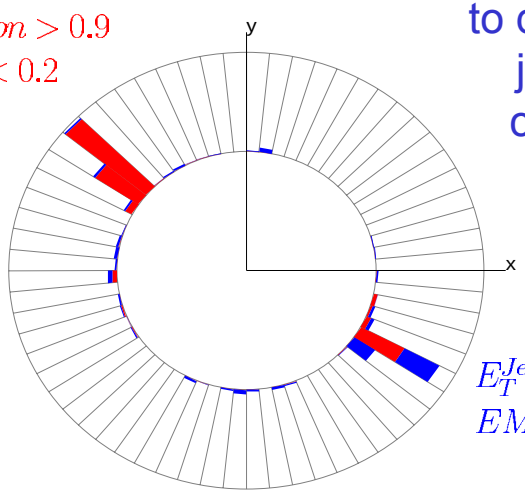
Run 128309 Event 256324



γ candidate

E_T^{γ}=27 GeV,
$EM\,fraction > 0.9$
$Isolation < 0.2$

This type of event is used to derive the jet energy calibration



jet

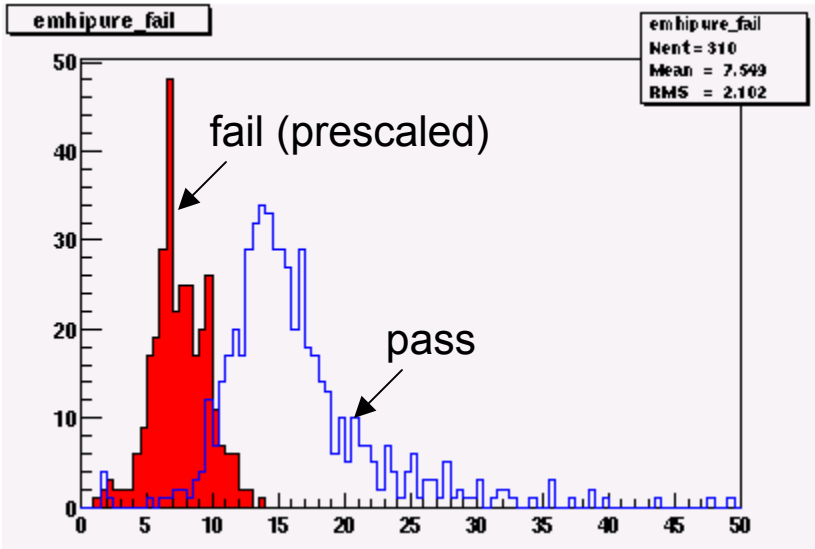
E_T^{Jet}=24 GeV
$EM\,fraction = 0.48$

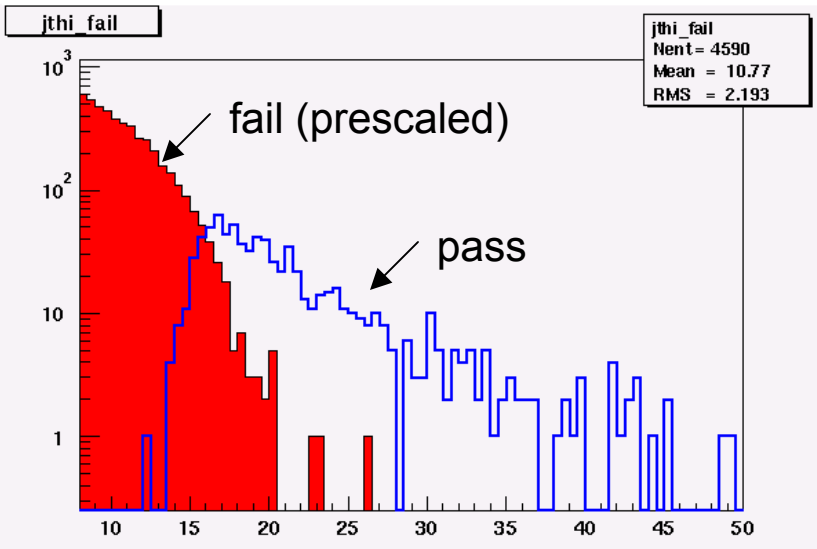
DØ

Level 3 calorimeter trigger

EM clusters, p_T > 10 GeV
Isolated, EM fraction > 0.9
$|\eta|$ < 1.1

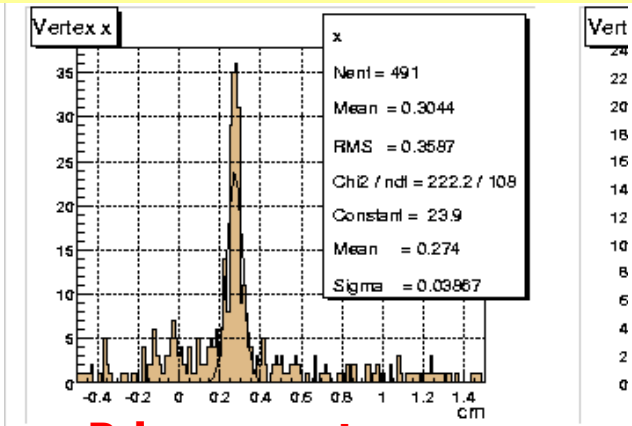
Jets, p_T > 15 GeV
R = 0.7 cone
$|\eta|$ < 1.1



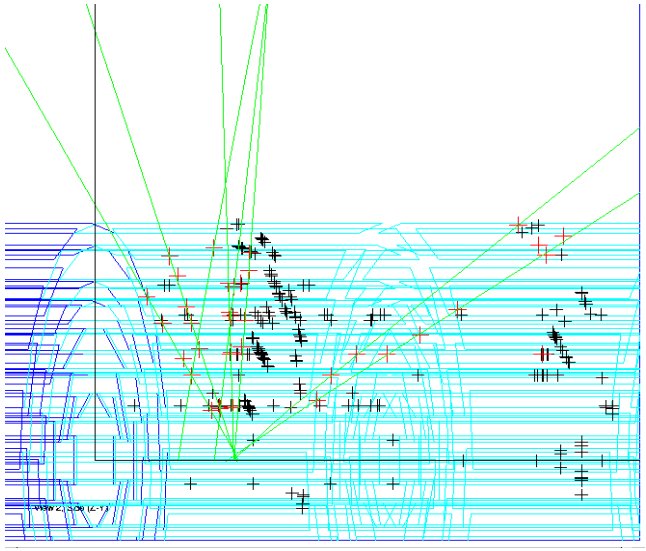


Volker Buescher
Mainz

DØ silicon performance

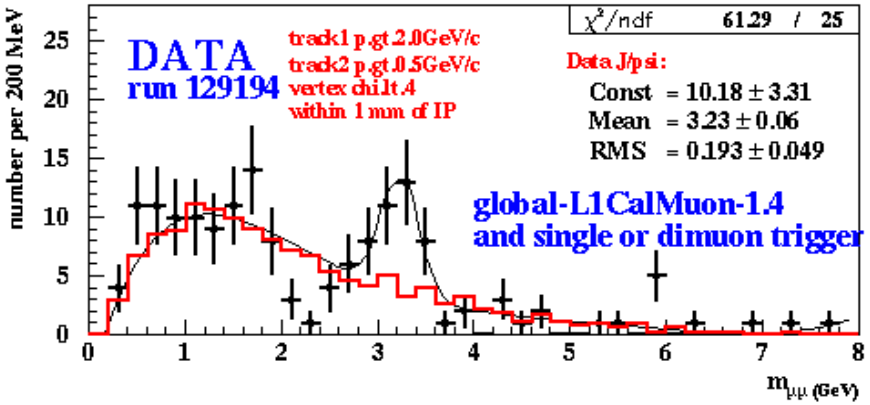


Primary vertex



First reconstructed tracks April 2001

J/ψ signal from silicon tracking

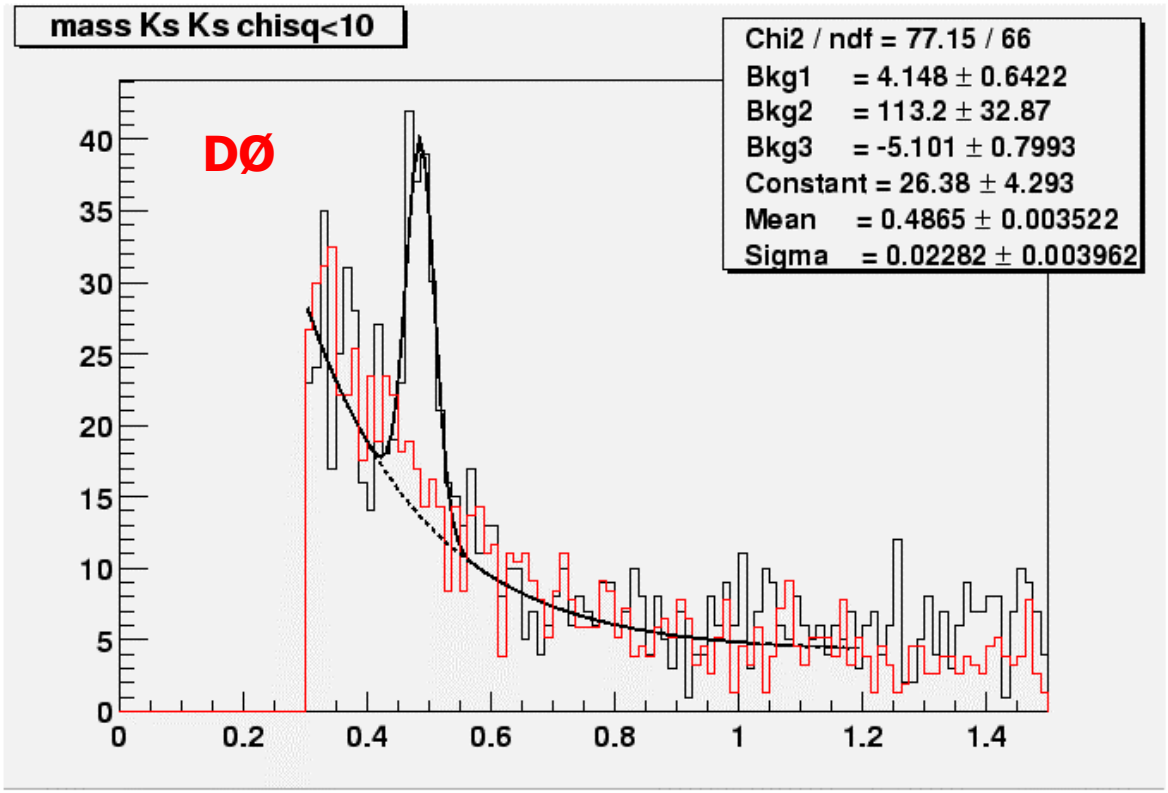


Single Run

$K_s \rightarrow \pi^+\pi^-$ candidates

Tracks reconstructed in the SMT detector

Brad Abbott, Oklahoma



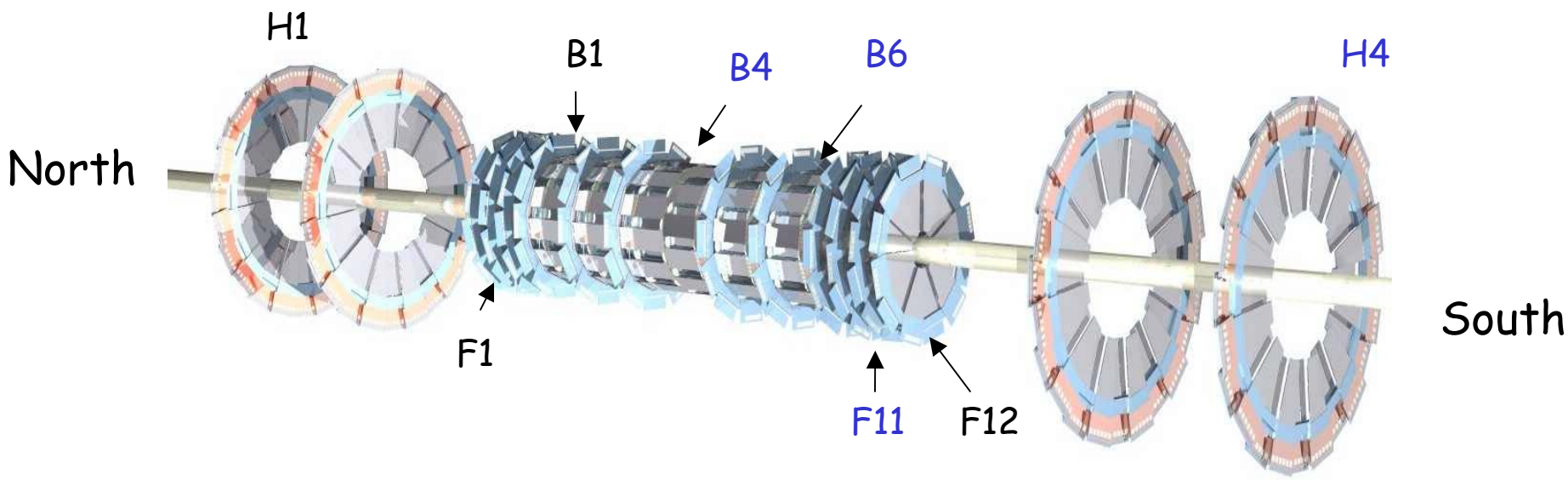
Black histogram – opposite-sign tracks

Red histogram – same-sign tracks

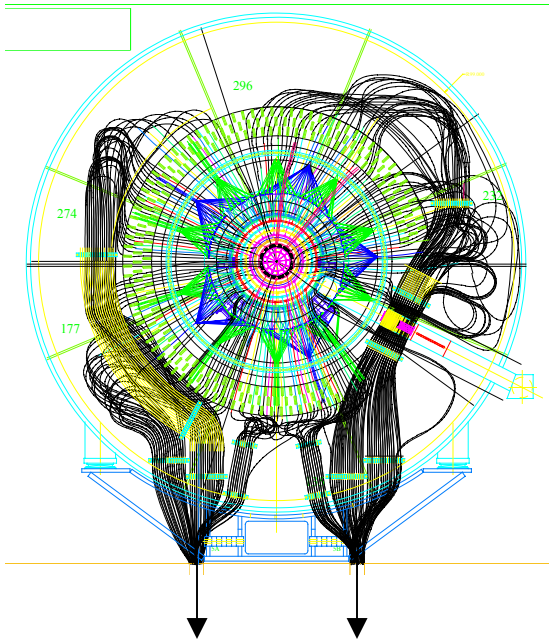
Dotted curve – fit to background

Full curve – fit to signal + background

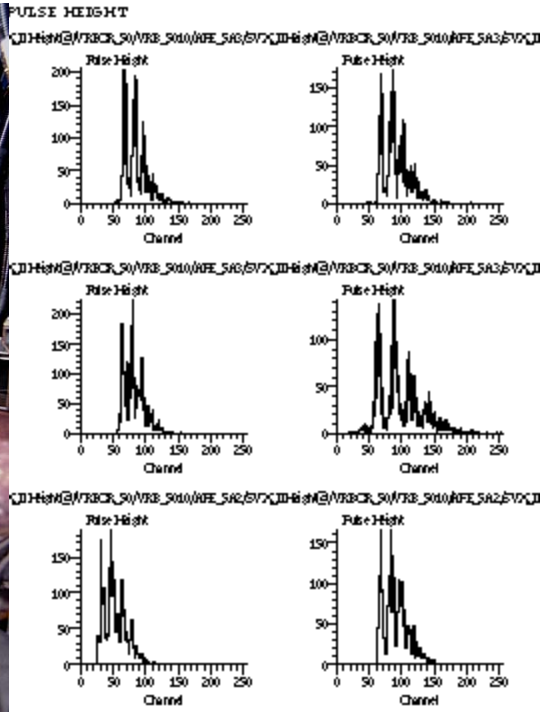
Silicon Detector



Fiber tracker readout



Readout under detector



Photoelectron peaks in final electronics in DØ

1 pe ~ 7 fC

Clear Fiber Waveguides carry the signals to VLPC's

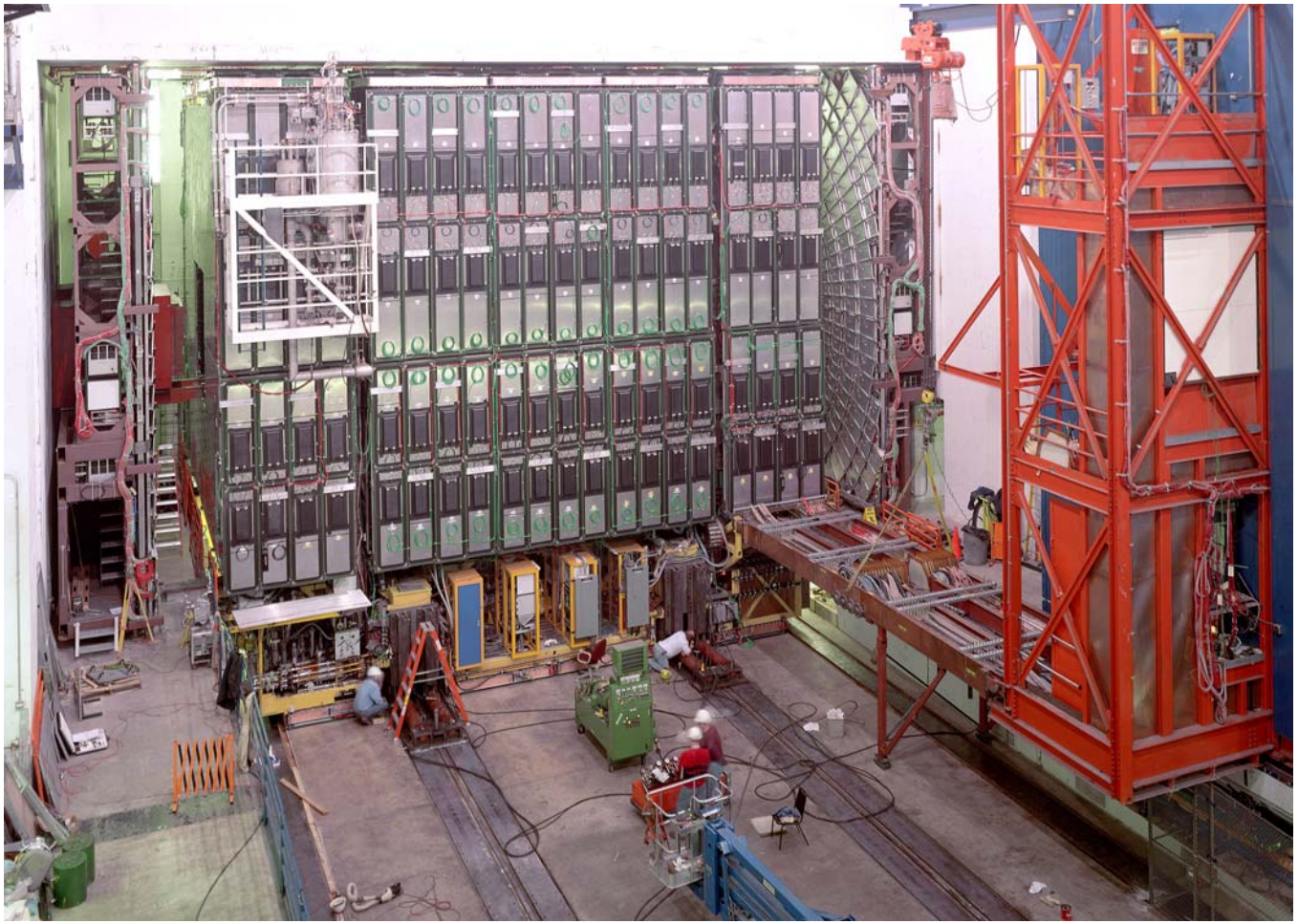
Solid state photon counters Operate at LHe temperature

The work of many people...

First collisions in the Run II DØ detector

April 3, 2001

Detector in Collision Hall January 2001



Detector in Collision Hall January 2001

DØ data in the news

WIRED NEWS BUSINESS POLITICS WIRE SERVICE CULTURE TECHNOLOGY TOP STORIES

Secrets of the Atom Revealed

By Jeffrey Benner

2:00 a.m. July 27, 2001 PDT

You can find a lot of information on the Web, but you just couldn't find a decent picture of the subatomic universe online.

Until now.

Scientists at the Fermilab in Illinois, home to the world's most powerful atom smasher, announced Wednesday that data collected during the last big round of experiments into the depths of the atom is now available online.

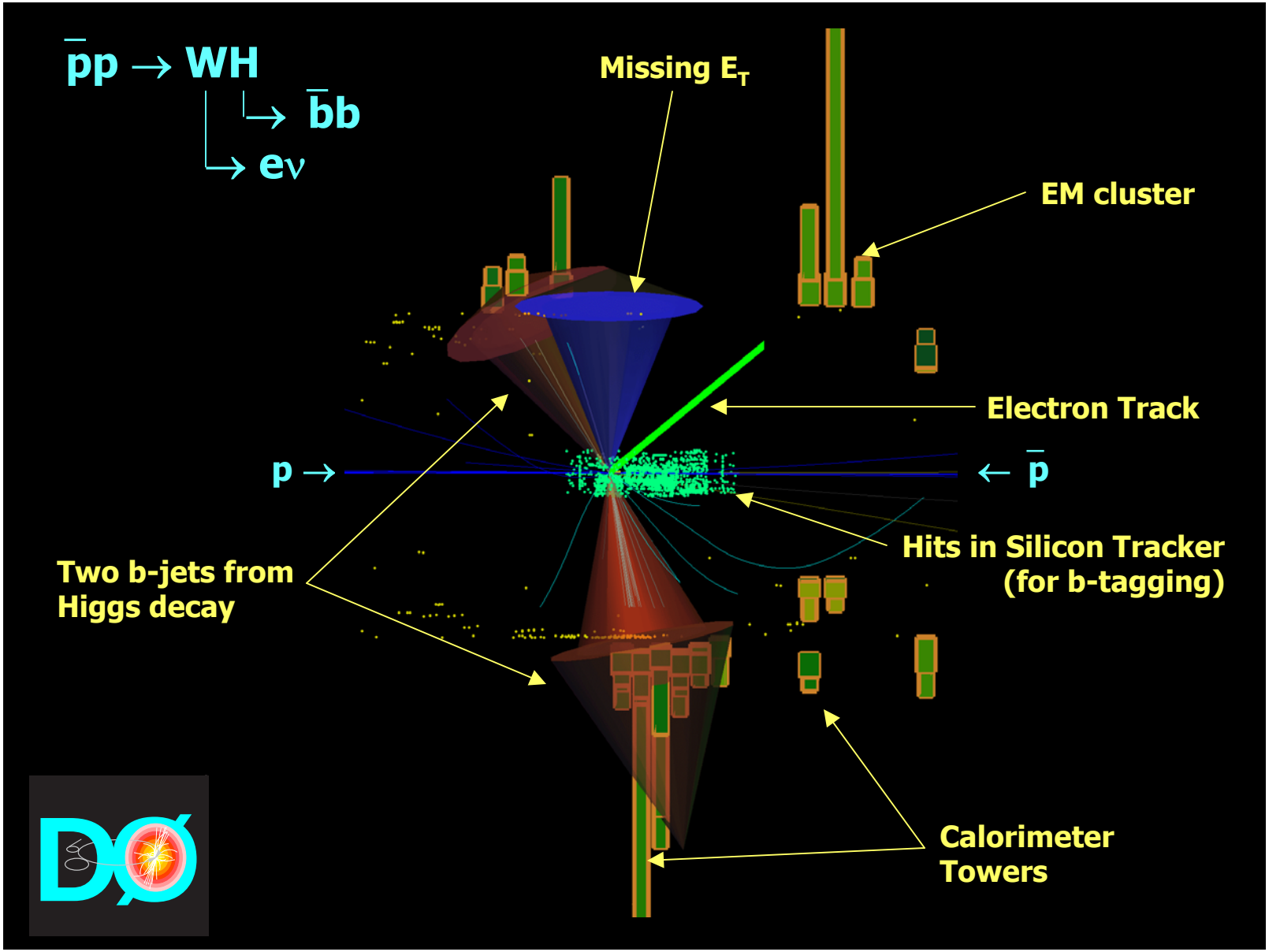
See also:
Fermilab's Smashing New Site
Big Bang Scientists Get Dense
Quantum Physics Meets the Qubit
Discuss this story on Plastic.com
Read more Technology news

Using a Web interface called Quaero, particle physicists around the world can go online to test their own theories against Fermilab's data.

The system is not quite the same as an automated database, but it's close. Scientists can request a search for signs of a particular particle -- generally in the form of a mathematical formula only a physicist could appreciate -- and the next day they'll hear, yea or nay, whether their hunch was correct.

The information was gathered during a series of experiments conducted from 1992 to 1996 with Fermilab's Tevatron, the world's most powerful particle accelerator.

About 500 scientists worked on the project. It's known as the DZero collaboration in honor of the five-story, 5,000-ton DZero microscope used to spot particles after an atom gets smashed.


$\bar{p}p \rightarrow WH$
$\hookrightarrow \bar{b}b$
$\hookrightarrow e\nu$
Missing E_T
EM cluster
Electron Track
$p \rightarrow$
$\leftarrow \bar{p}$
Hits in Silicon Tracker
(for b-tagging)
Two b-jets from
Higgs decay
Calorimeter
Towers