

# Overview on May Running Period

Roman Pöschl

LAL Orsay  
CALICE Ecal Meeting  
3/6/08

- Installation Period
- Beamline at FNAL
- Overview on Data taken
- Outlook on July Running

## MTBF – Meson Testbeam Facility at Fermilab



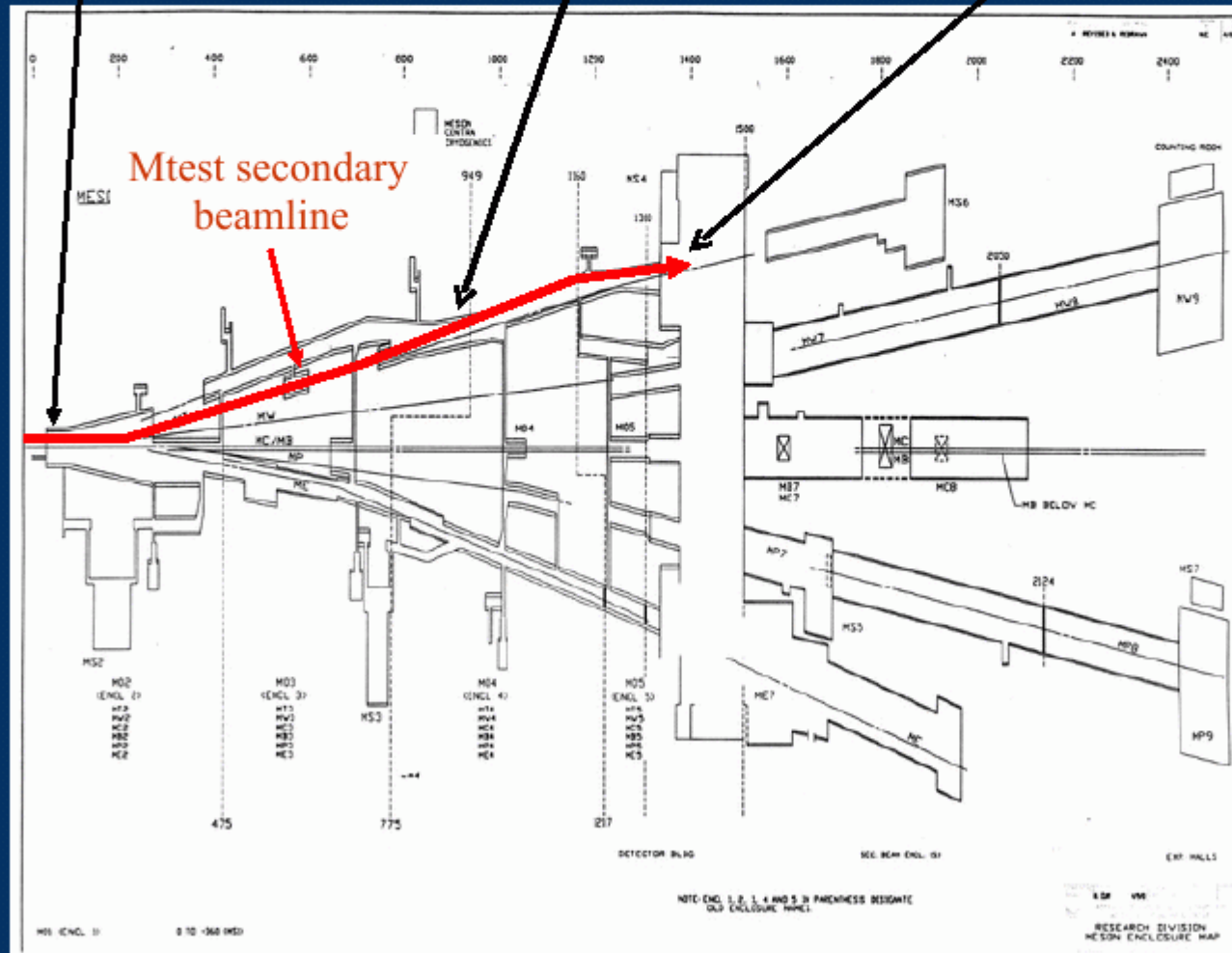
- Beam is created by a primary Proton beam of 120 GeV/c

# Test Beam Layout and Modes

Movable upstream 30 cm Al target

Movable downstream target location

Meson Test Beam Facility



**Proton Mode: 120 GeV**  
protons transmitted  
through upstream  
target

**Pion Mode: 8-66 GeV**  
beam tuned for  
secondaries from  
upstream target

**Low Energy Pion  
Mode: 1-32 GeV beam**  
tuned for secondaries  
from downstream  
target

# CALICE Testbeam at FNAL

- Installation Phase: 7/4/08 – 25/4/08
- Commissioning Phase: 28/4/08 – 7/5/08
- “Physics Runs” Phase: 7/5/08 - 27/5/08

## General Running Conditions:

- Day operation – Beam between ~6am and 6pm
- Testbeam delivery interrupted by “Shot Setup” for TEVATRON experiments ~2 hours during our running
- No major machine downtime  
Some failures towards the end of the running  
Compensated by two extra half days on 26/5/08 and 27/5/08 – Running 6am – 12pm  
Agreement on short notice

FERMILAB provides excellent support for our running

- see above
- e.g. Extensive help during (non trivial) setup of computing

# Installation at FNAL – The Start



**(1 container out of 3)**



*G. Mavromanolakis AEM Talk*

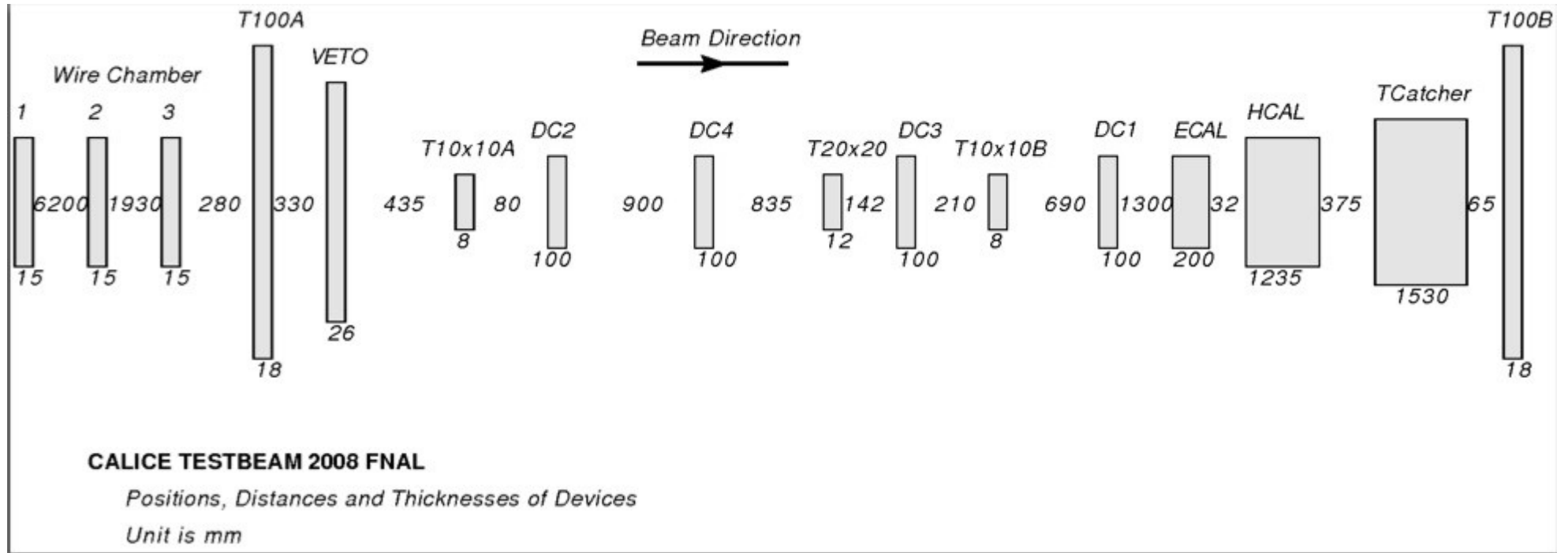
Everything arrived on time and **UNDAMAGED** at FNAL

# Detector Installation



- Equipment ready by 25<sup>th</sup> of April – Ready to accept beam on the 29<sup>th</sup> of April
- Setup – Combined effort of DESY, Uni Heidelberg, NIU, LLR, LAL and FNAL
- Setup comprises SiW Ecal, Ahcal and TCMT plus beamline equipment

# Sketch of the beamline



A.Kaplan, H.Li

# Experimental Control

- Live demonstration (planned)  
Place yourself to  
<http://calice-cam01.fnal.gov:8080>  
<http://calice-cam03.fnal.gov:8080>
  - Conferencing system
    - Daily operations meeting
    - Regular communication between calice control room at FNAL and 2<sup>nd</sup> Control room at DESY or colleagues elsewhere in the world
  - Portal service (live demonstration planned)  
[https://calice-portal01\(2\).fnal.gov](https://calice-portal01(2).fnal.gov)
- CALICE has implemented a first GDN foreseen for future ILC (and beyond) experimentation  
Main responsible Sven Karstensen (DESY)

Deutsches Elektronen Synchrotron DESY  
Hamburg, Germany

**Remote Control System and Room for  
CALICE and other Facilities**

Authors: R. Esberg, E. Garutti, A. Kaslan, S. Karstensen, B. Lutz, N. Meyer,  
R. Pöschl, B. Yambsch

Remote control systems are becoming more and more important to give us the flexibility to control facilities, provide assistance and intervene in case of problems at any time and from every place. As a global operating group CALICE (Calorimeter for the Linear Collider Experiment) with approx. 220 members worldwide is dependent on using a remote control system for shifts and monitoring of the data taking. CALICE has at present installed its detector at Fermilab, Chicago, where will run test beam experiments for the next year.

The components of the remote control structure cover a web based secure global desktop, which allows every user to secure single sign on login, if necessary kerberized, to the control room operating systems, without having detailed knowledge of the operating systems themselves. Additionally a conference system with a permanent connection between remote and on-site shifts is implemented to give all participants the possibility to work "in the same room". Last but not least a camera system with possibility of remote control options has been installed. This system CONSISTS OF several cameras, which allow fast, easy and very accurate observation of all experimental areas. This should give experts the opportunity to diagnose problematic situations without direct access to the experimental enclosure, and provide feedback to the crew in situ.

**CALICE of Fermilab**  
Control System  
Conference System  
Observation System

**CALICE Control Room at DESY**  
Control Console  
Conference System  
Control Room

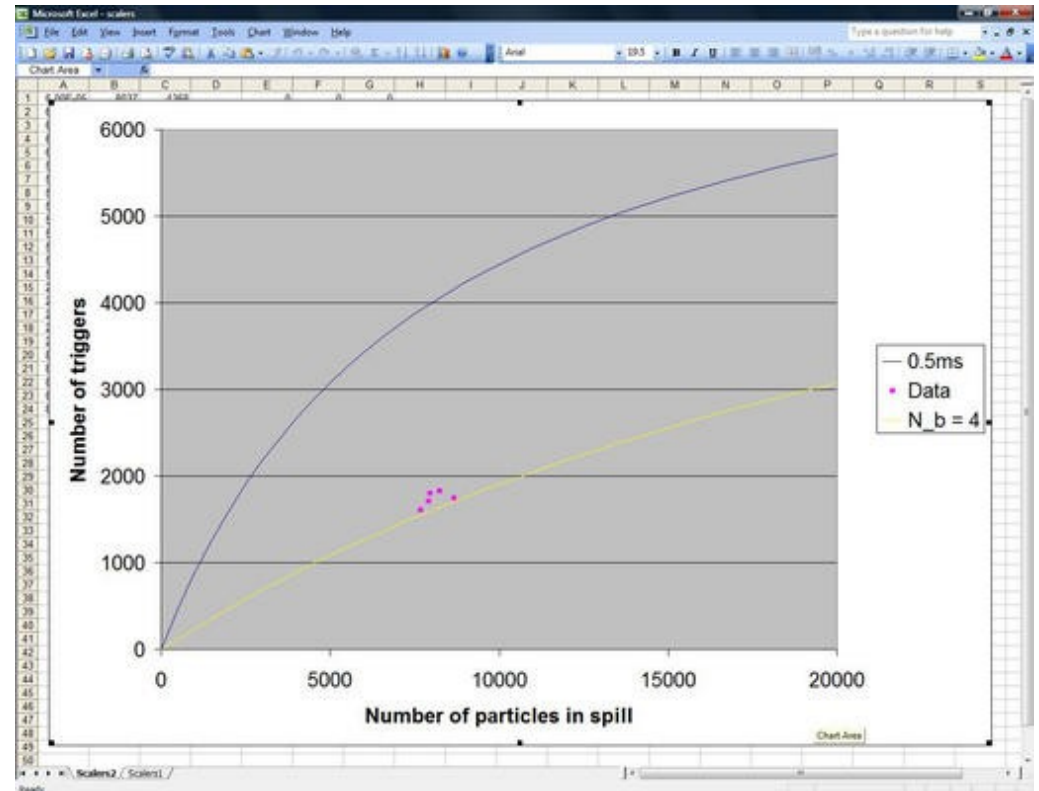
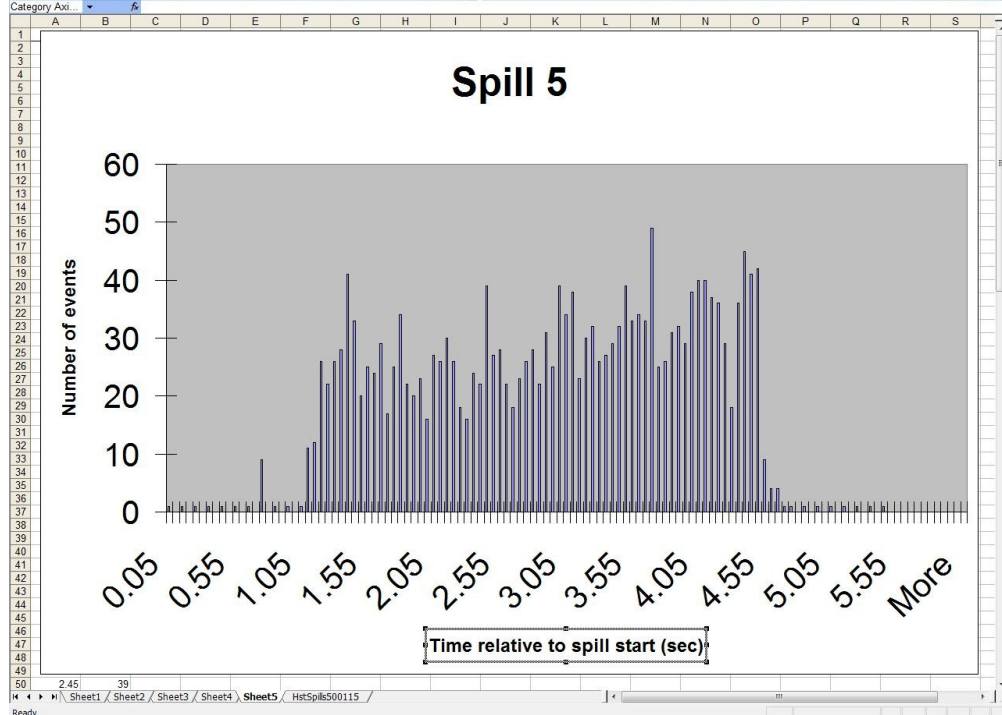
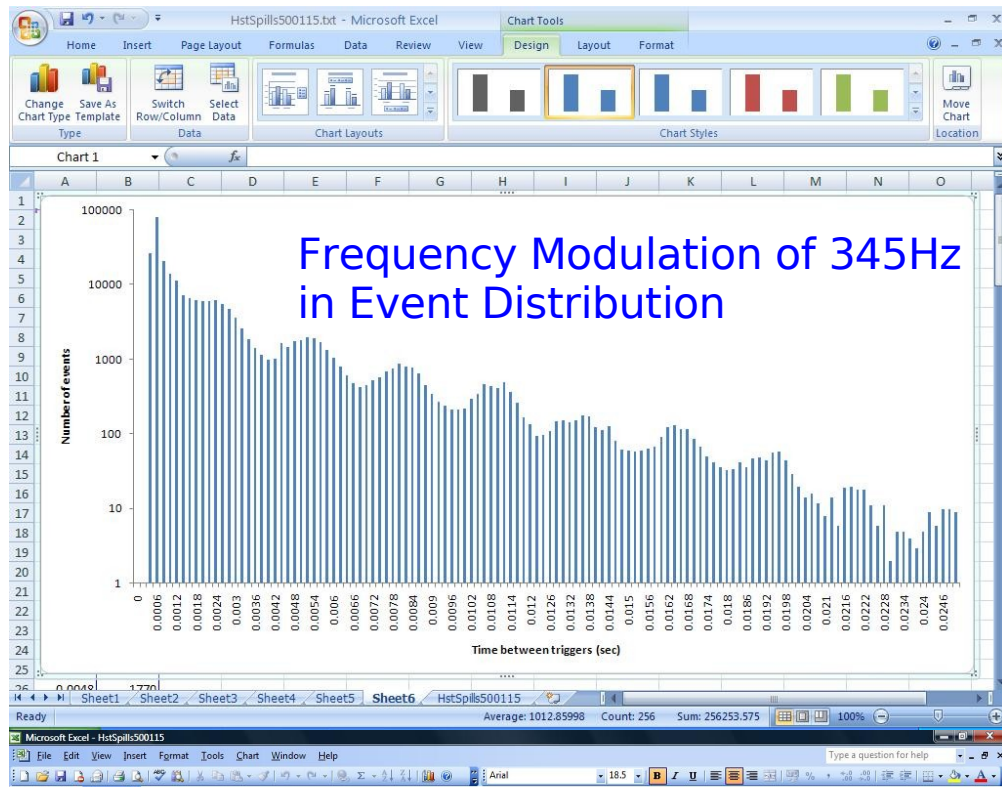
Internet

One very important issue in the decision of installing a remote control facility is also the price / work-quality ratio. To install a remote control room should have a negligible impact on the overall project cost. This project has been realized within an adequate time, a minimum amount of manpower and maintenance but with a maximum efficiency. The realization of a remote control system considering the above mentioned items is shown here.

Sven Karstensen DESY, May 2008



# Beam Bursts



- DAQ Deadtime  $\sim 0.5$ msec
- DAQ Buffer Limit 2000 Events
- Bursts reduce efficiency of Data Taking

# The FNAL Beam

Results from G4Beamline Simulation of MTest

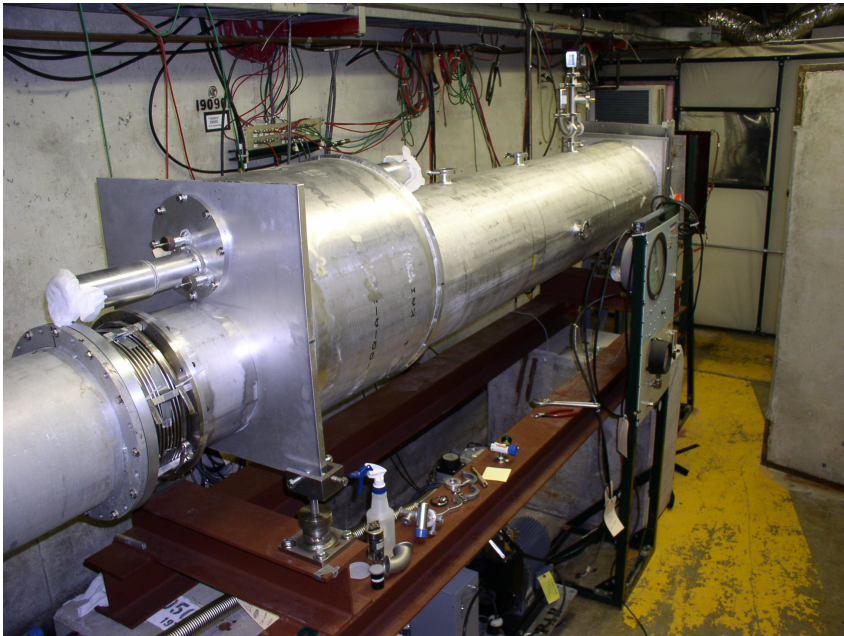
Energy	Lead (mm)	#pions	#electrons	Ratio
1 GeV	0	710	9990	0.07
	0.5	15	129	0.12
	1	8	43	0.19
	2	5	6	0.83
	5	2	5	0.4
2 GeV	0	2440	9990	0.24
	0.5	200	486	0.41
	1	88	158	0.56
	2	46	27	1.71
	5	10	1	10
4 GeV	0	5030	9990	0.5
	0.5	1198	1585	0.75
	1	671	548	1.2
	2	308	110	2.8
	5	109	2	55

*E. Ramberg, T.Rinn*

Low rates at low particle energies

# New Differential Cerenkov counter

20m Upstream of Calice Detectors



Win Baker\* copied design  
used successfully in MIPP  
Jim Kilmer in charge of  
construction

Counter commissioned just  
before CALICE arrival

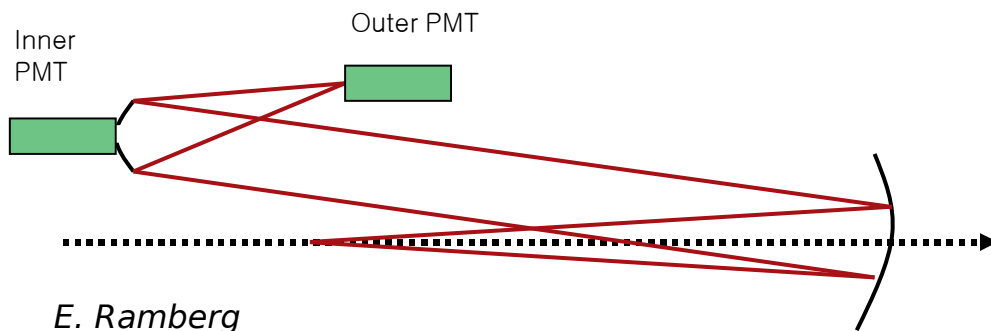
Timing of signals is just fast  
enough to be included in  
CALICE trigger

“Inner PMT” - accepts light near  
threshold

“Outer PMT” - accepts light from  
plateau region

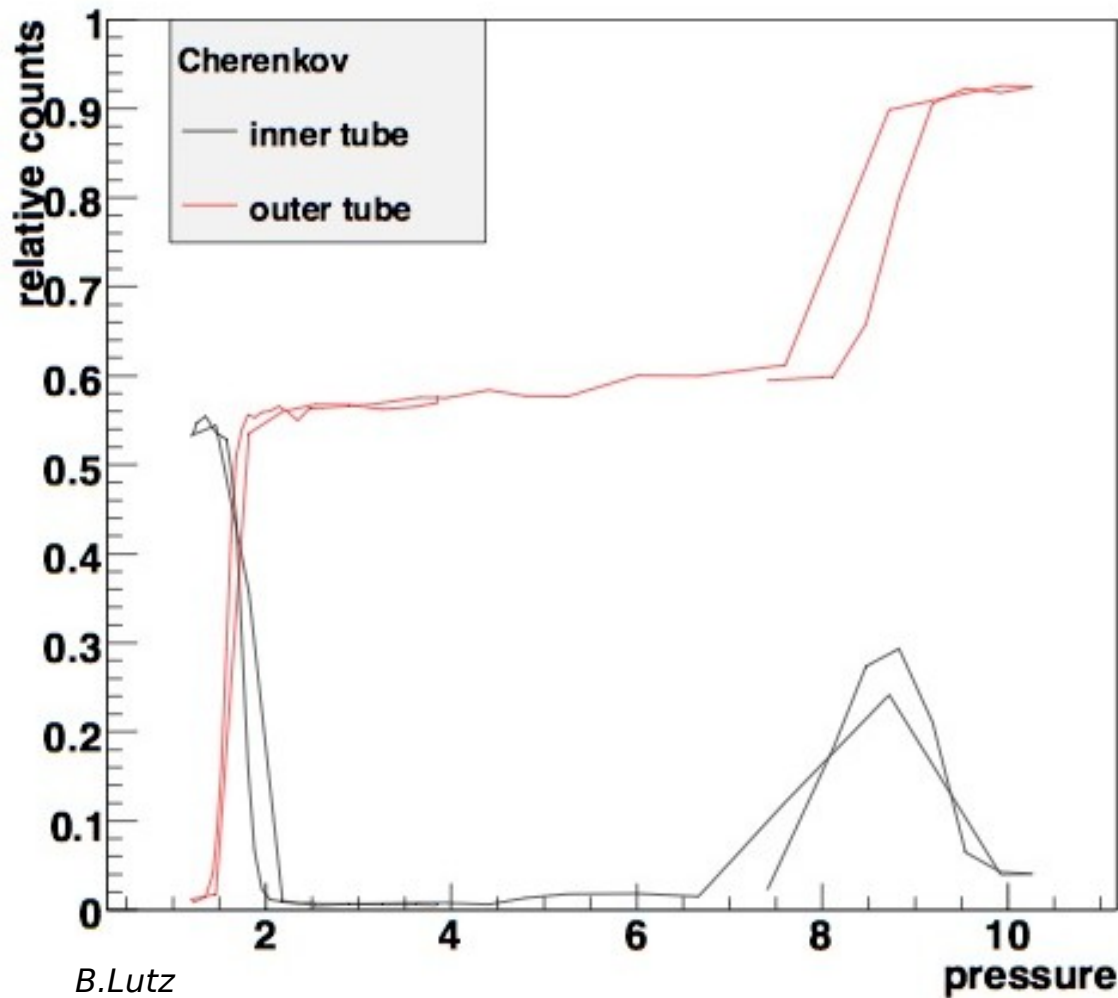
“Inner x OutBar” - highly specific  
as to particle species

Inclusion of Cerenkov Counter  
in Trigger to create “pure” (pion) samples



E. Ramberg

# Cerenkov Pressure Curve



Electrons

Pions

B.Lutz

Increasing refraction index of Cerenkov Gas

Regular recording of Cerenkov Pressure Curve  
Cerenkov Pressure in Calice Data Stream

# Timing of the Cerenkov Trigger

E.Garutti, B.Lutz, A.Kaplan, V. Zutshi

Due to finite propagation time Trigger Signal from Cerenkov arrives  
~60 ns (~10 DAQ clock ticks) after the '10x10 coincidence' –  
Trigger 'working horse'

- 10x10 Trigger signal has to be delayed



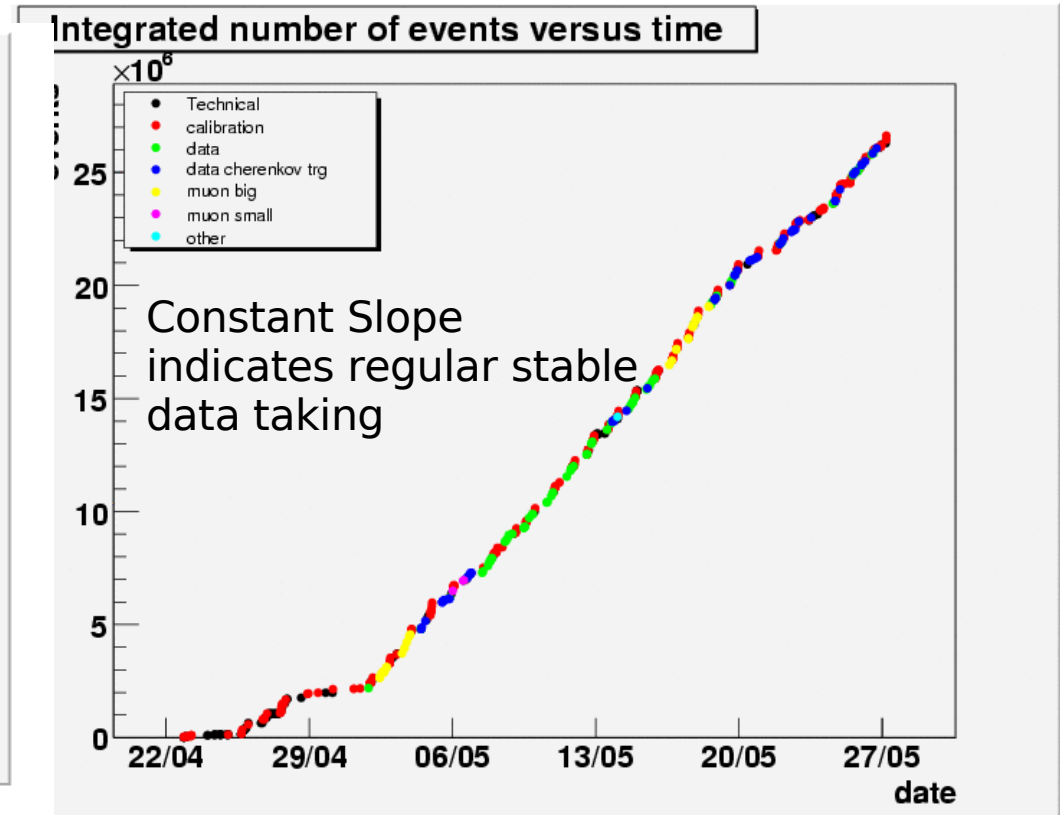
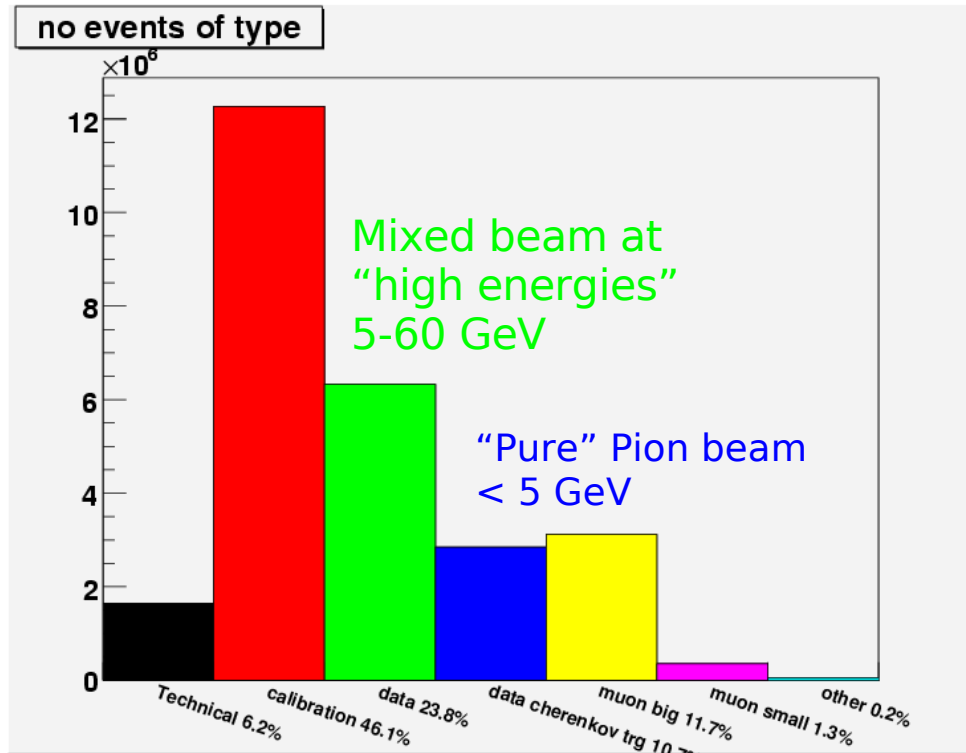
Example of Coincidences between:

10x10A 10x10B  
Cerenkov  
100x100B (Muon Trigger)

Trigger Mix lead to “pure” pion  
sample at ~200 Events/Spill  
Partially large muon contamination

- Particles propagate faster than Cerenkov Signal
  - Trigger Latency and details of signal formation in Calice Front Electronics
- ⇒ Risk to record detector signal in falling slope (Discussed by Hengne and Marcel)

# “Luminosity” - Recorded Data

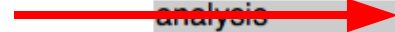


- Data sets with translated (5 points with 3cm horizontal distance) and rotated  $10^\circ$  and  $30^\circ$  Detectors

Rotation worked fine apart from a few hickups (“Kinderkrankheiten”)

# Calice Shift Plan May 2008

	May 08	May 09	May 10	May 11	May 12	May 13	May 14
19:00-06:00							
06:00-12:30							
ECAL	M. Reinhard	M. Reinhard	M. Reinhard	M. Reinhard	M. Reinhard	M. Reinhard	M. Reinhard
HCAL	N. Feege	N. Feege	N. Feege	N. Feege	N. Feege	N. Feege	N. Feege
analysis	N. Meyer	N. Meyer	N. Meyer	R. Fabbri	R. Fabbri	R. Fabbri	R. Fabbri
12:30-19:00							
ECAL	J. Puerta	J. Puerta	J. Puerta	J. Puerta	J. Puerta	J. Puerta	F. Morisseau
HCAL	B. Lutz	B. Lutz	B. Lutz	B. Lutz	G. Eigen	G. Eigen	G. Eigen
analysis	J. Repond	J. Repond	L. Xia	L. Xia	F. Simon	F. Simon	F. Simon



Remote Shifts from DESY

	Thursday May 15	Friday May 16	Saturday May 17	Sunday May 18	Monday May 19	Tuesday May 20	Wednesday May 21
19:00-06:00							
06:00-12:30							
ECAL	B. Mustapha	B. Mustapha	B. Mustapha	B. Mustapha	L. Morin	L. Morin	L. Morin
HCAL	H. Li	H. Li	N. Wattime	N. Wattim	N. Wattime	N. Wattim	P. Dublet
analysis	O. Wendt	N. D'Ascenzo	N. D'Ascenzo	N. D'Ascenzo	E. Garutti	E. Garutti	E. Garutti
12:30-19:00							
ECAL	F. Morisseau	F. Morisseau	F. Morisseau	F. Morisseau	F. Morisseau	F. Morisseau	F. Morisseau
HCAL	G. Eigen	J. Zalesak	J. Zalesak	J. Zalesak	J. Zalesak	J. Zalesak	J. Zalesak
analysis	F. Simon	F. Simon	F. Simon	L. Xia	B. Mustapha	B. Mustapha	B. Mustapha

	Thursday May 22	Friday May 23	Saturday May 24	Sunday May 25	Monday May 26	Tuesday May 27	Wednesday May 28
19:00-06:00							
06:00-12:30							
ECAL	L. Morin	L. Morin	L. Morin	L. Morin	L. Morin	L. Morin	
HCAL	S. Magill	S. Magill	G. Wilson	S. Magill	G. Wilson	G. Wilson	
analysis	E. Garutti	O. Wendt	O. Wendt	O. Wendt	S. Richter	S. Richter	
12:30-19:00							

E. Garutti

Broad Participation in Shifts – (Once more) a great pleasure  
Apologizes to those not appearing in the screen shot

## Summary and Conclusions

### - First Successful New Steps in the New World

Citation E.Ramberg: "You showed me things about the beam I wasn't aware of"  
"You guys can be proud of your experiment"  
"You brought in the equipment I was waiting for"

Dear Erik and George et al,

Thanks for giving presentations on the Testbeam infrastructure and  
the CALICE results.

They looked great! And I would like to congratulate and  
thank every one of you who was involved in this effort.

All the very best,  
Young-Kee

- Steep learning curve on how to take data and work in Fermilab environment  
Strong support by Fermilab
- Commissioning of experimental setup parallel to data taking  
Handling of Cerenkov Counter  
Trigger Latency  
Improvements by fast HERA-B PMT (Idea of Beni)
- Still already lots of interesting data on tape
- Let's draw the right conclusions for the July Running  
9/7/08 – 29/7/08 (or longer)