



CDF Preshower/Crack Detector Upgrade

Steve Kuhlmann (Argonne National Laboratory)

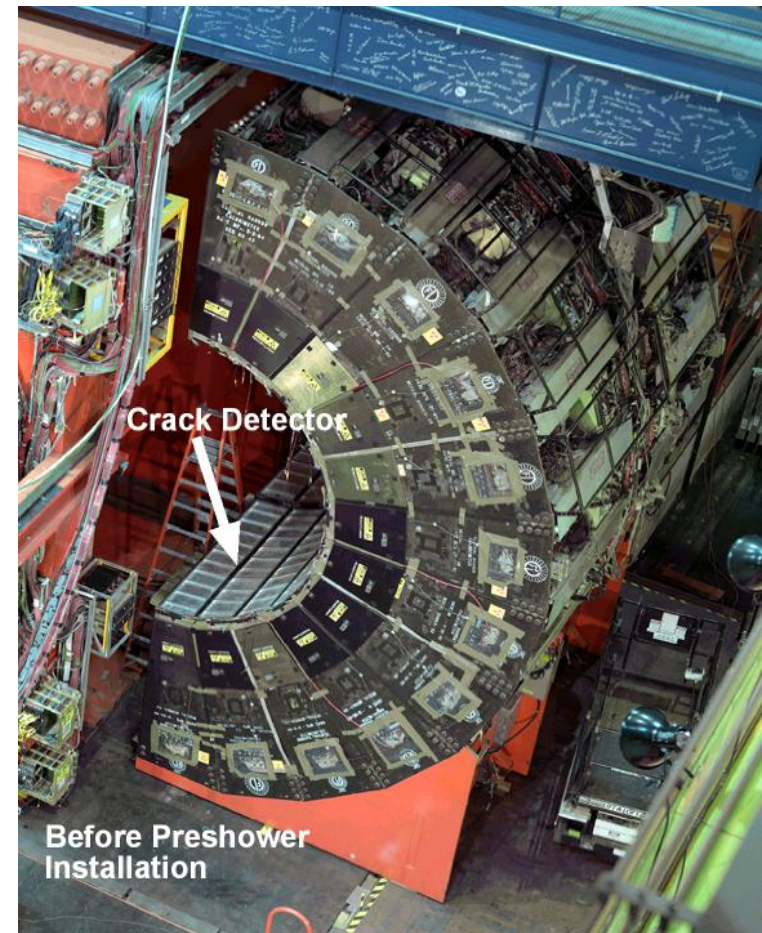
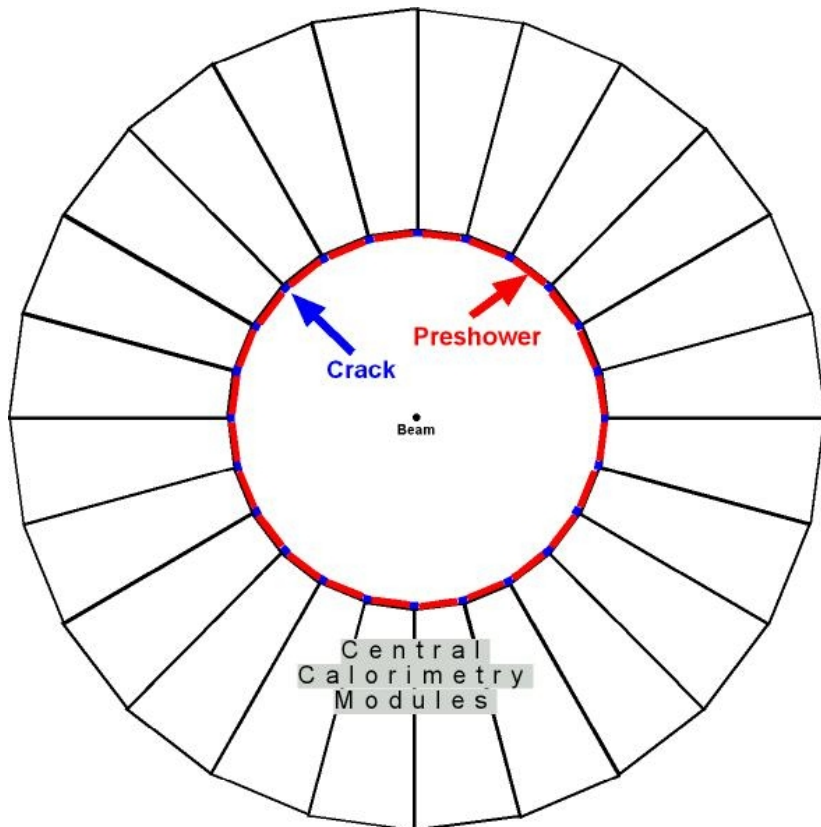
presented by: G. Introzzi (INFN & Univ. of Pavia)

ILC workshop - Snowmass - August 23, 2005

- Argonne National Laboratory
- Fermi National Accelerator Lab.
- INFN (Pavia, Pisa, Roma, Trieste)
- JINR (Dubna)
- Kyungpook National University
- Michigan State University
- Rockefeller University
- University of Tsukuba



Preshower/Crack Detectors



Preshower Detector (CPR)

CPR2 Overview

- 24x2 Wedges
- Scintillator tiles

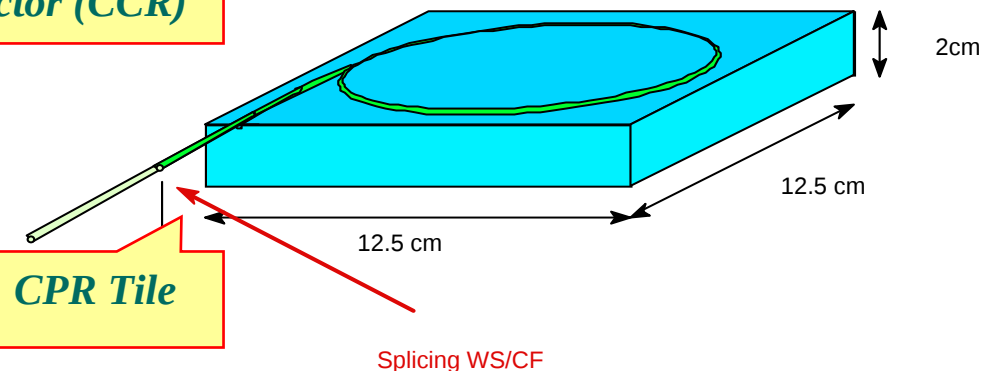
	Wedge	Total
CPR	54	2,592
CCR	10	480

- Total n. of channels=3,072
- CPR: 12.5x12.5x2 cm single tile
- ~ 810 Liters of scintillator
- CCR: 22.5x5x0.5 cm single tile

• Photomultipliers

- 16 channels per PMT (H6568)
- 192 HV channels
- CAEN HV SY527

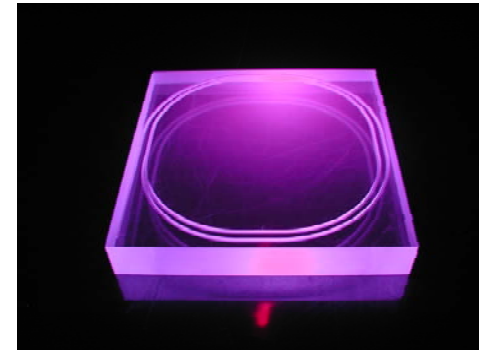
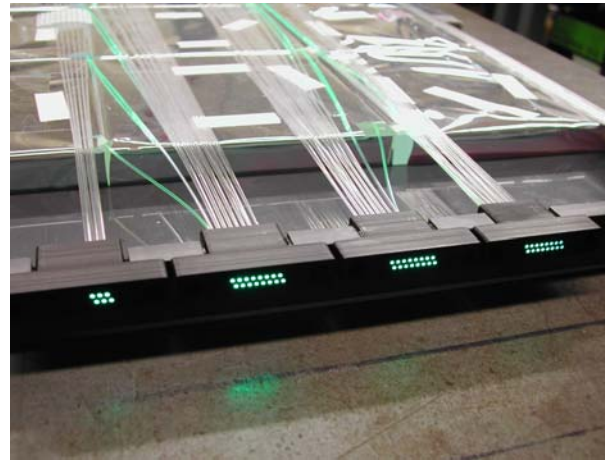
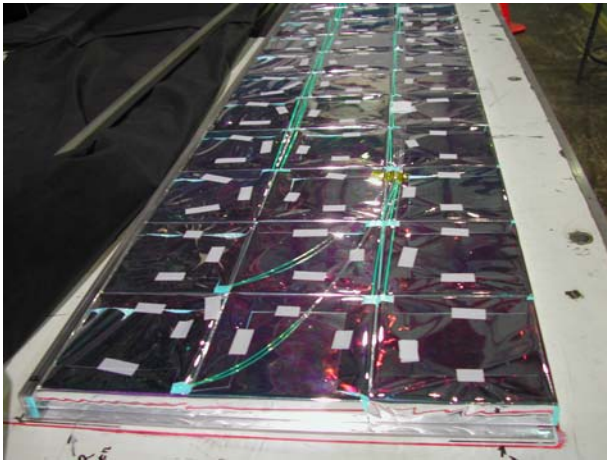
Crack Detector (CCR)



- CPR segmentation = $2 \times 3 (\eta - \phi)$ /tower
- 64 channels/wedge, exactly 2 SMD cards per wedge, to reuse present electronics
- WLS fiber into groove, spliced to clear fiber at tile exit, routed to optical connector



Preshower Test Results



Test	Fiber into spiral	Mirror	Reflector	Pe/MIP
1	Pol.Hi.Tech	No	Tyvek	24.1
2	Pol.Hi.Tech	Yes	Tyvek	29.4
3	Kuraray Y11(250)	No	3M	28.1
4	Kuraray Y11(250)	Yes	Tyvek	30.5
5	Kuraray Y11(350)	No	Tyvek	28.7
6	Kuraray Y11(350)	No	3M	32.9
7	Kuraray Y11(350)	Yes	3M	38.2
8	KurarayY11(350)+Grease	Yes	3M	43.9

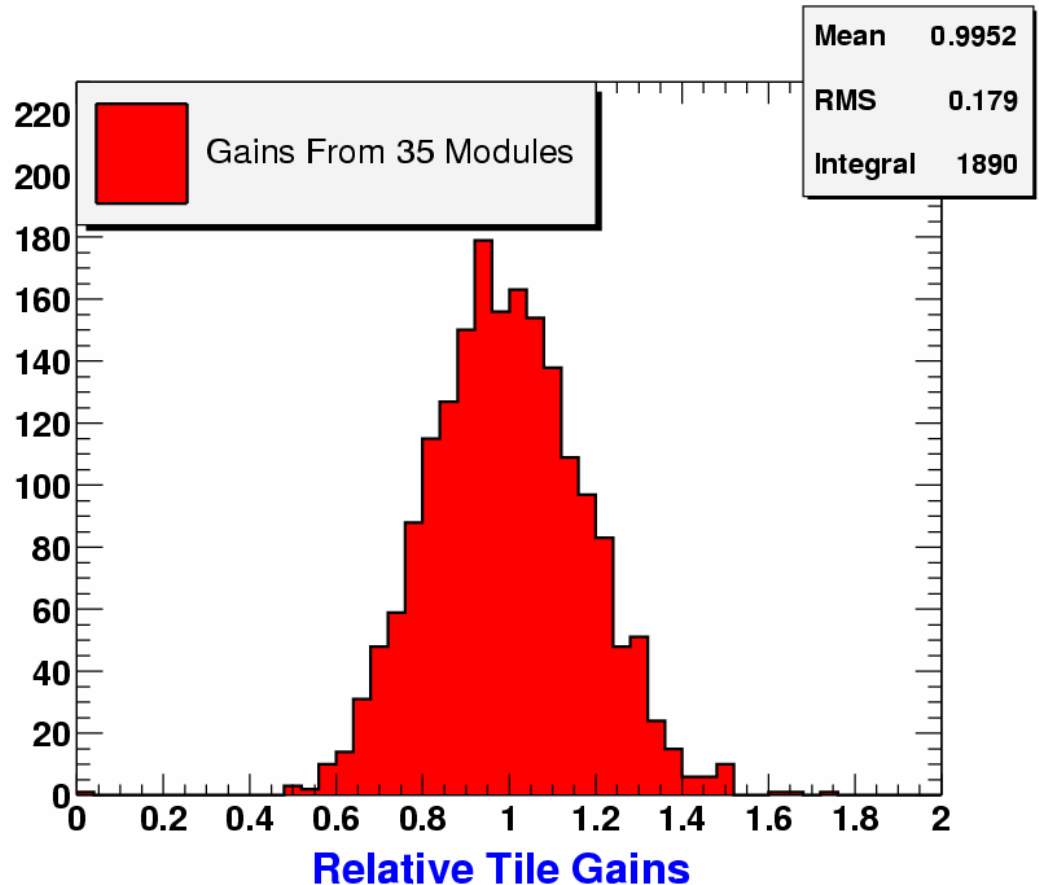


Preshower Bench Tests

Detector gains
corrected for PMT
pixel variations.

Gain variation known
to be mostly due to
scintillator variation.

Each tile is easily
calibrated/recalibrated
with MIP peaks in 5
minutes of collider
data.

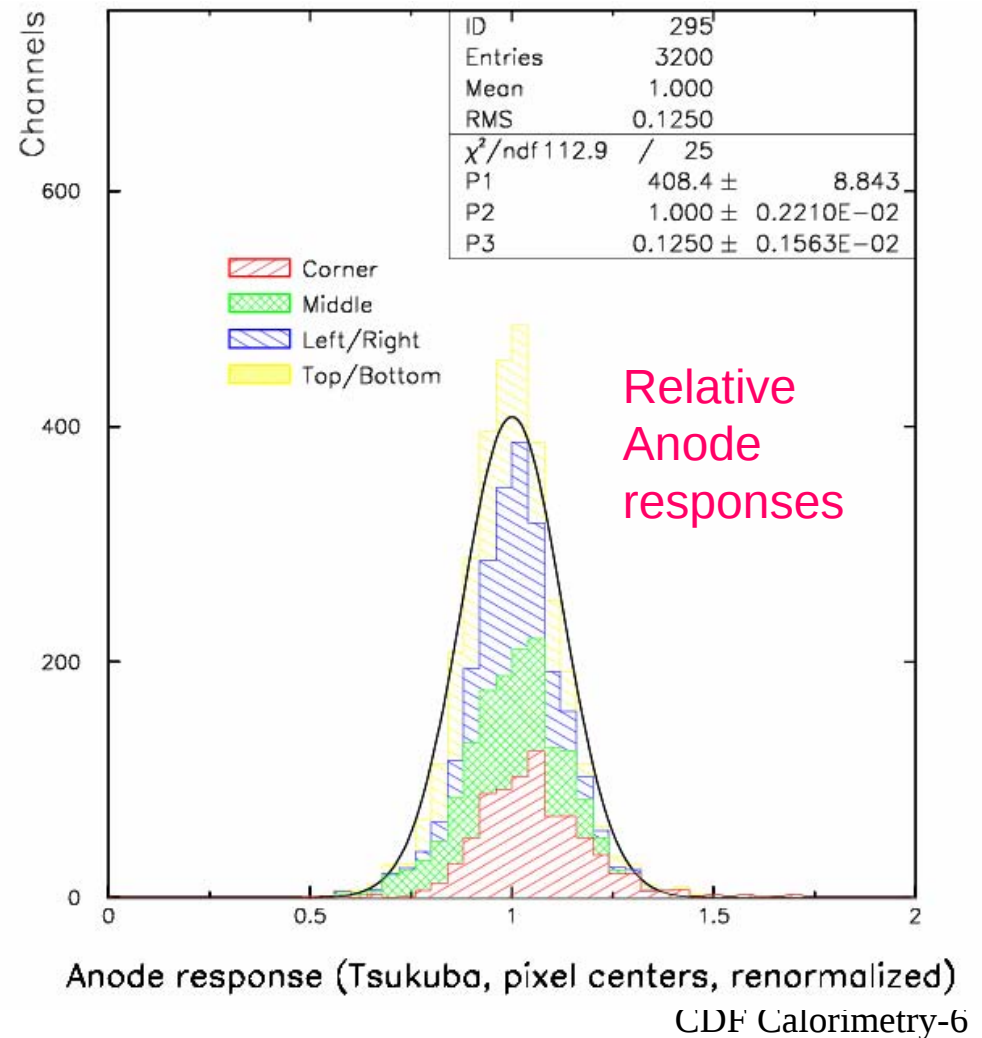




Preshower/Crack PMTs

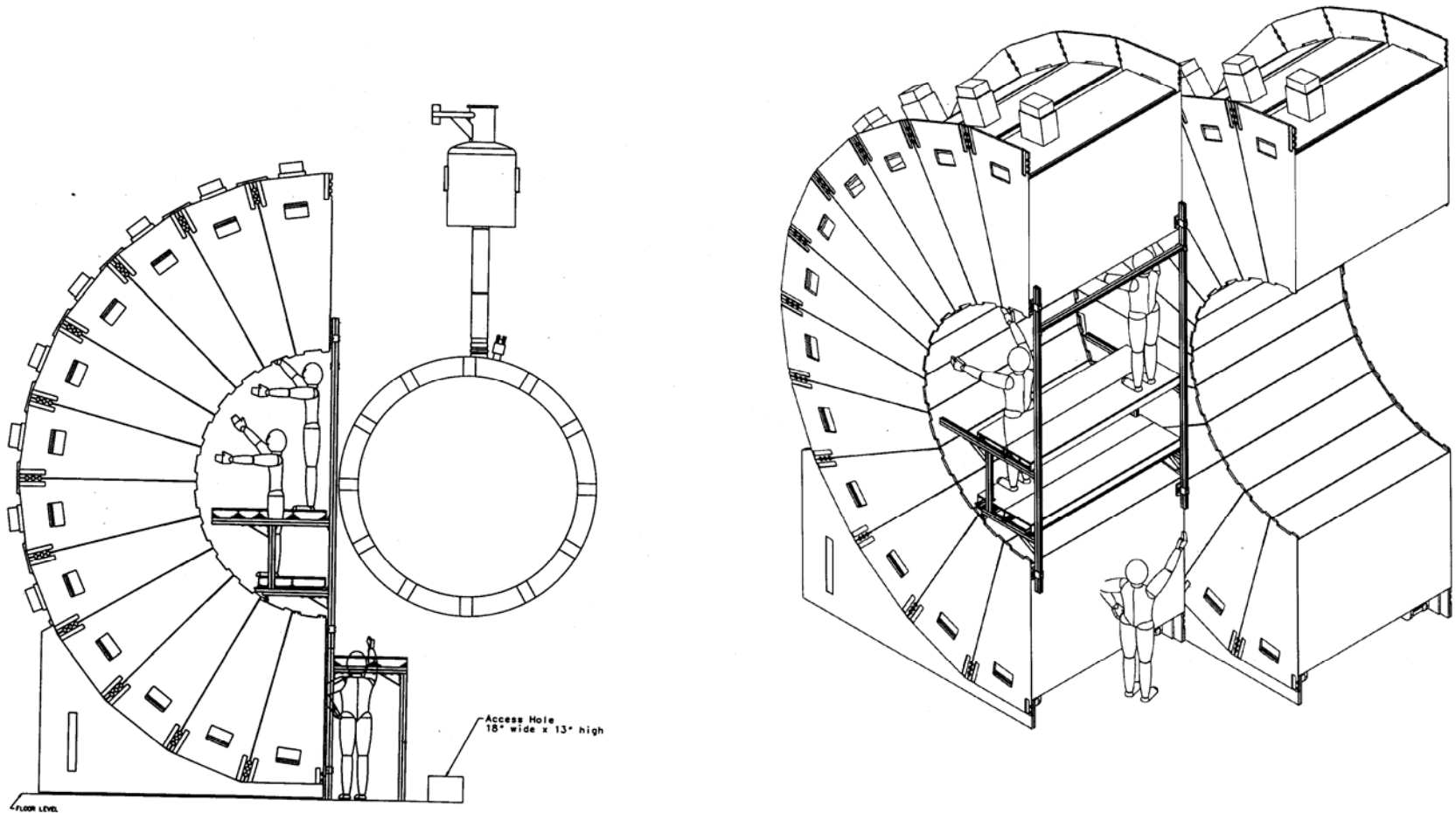


- 220 R5900
16-channel PMTs,
delivered and tested
at Tsukuba by Fumi
Ukegawa.





Installation Configuration





Preshower/Crack Detectors





Preshower/Crack Detectors



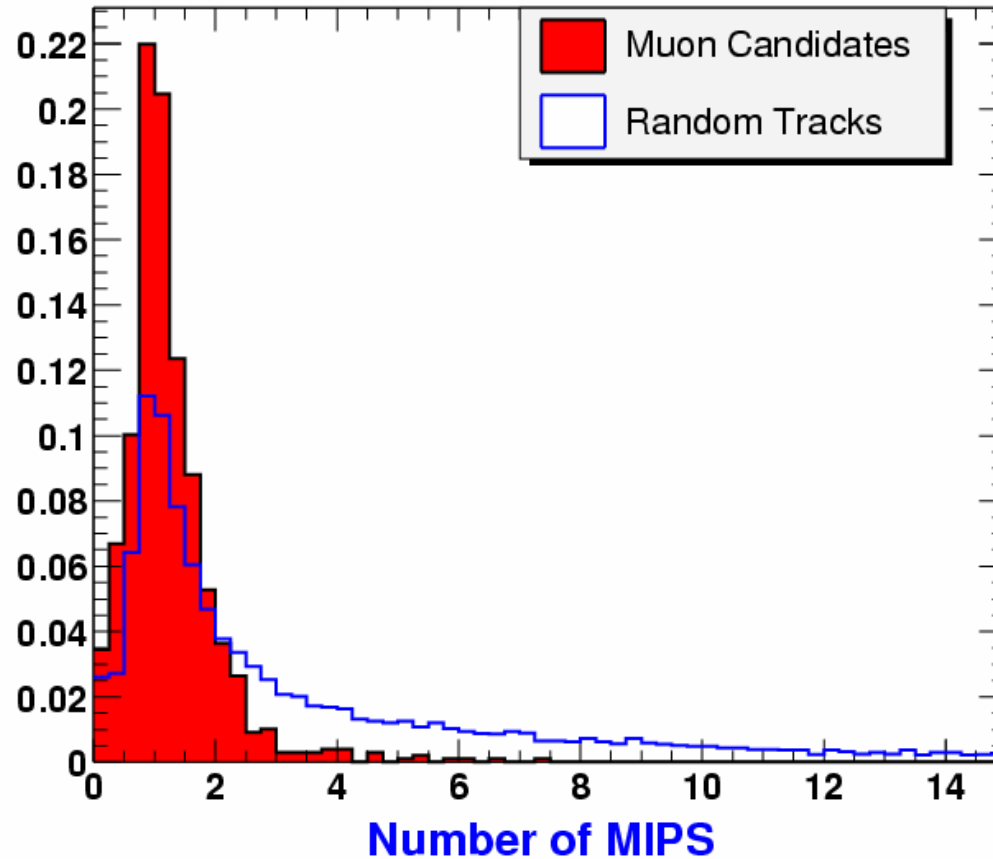


$\frac{1}{2}$ of Installation has a
confined entry point



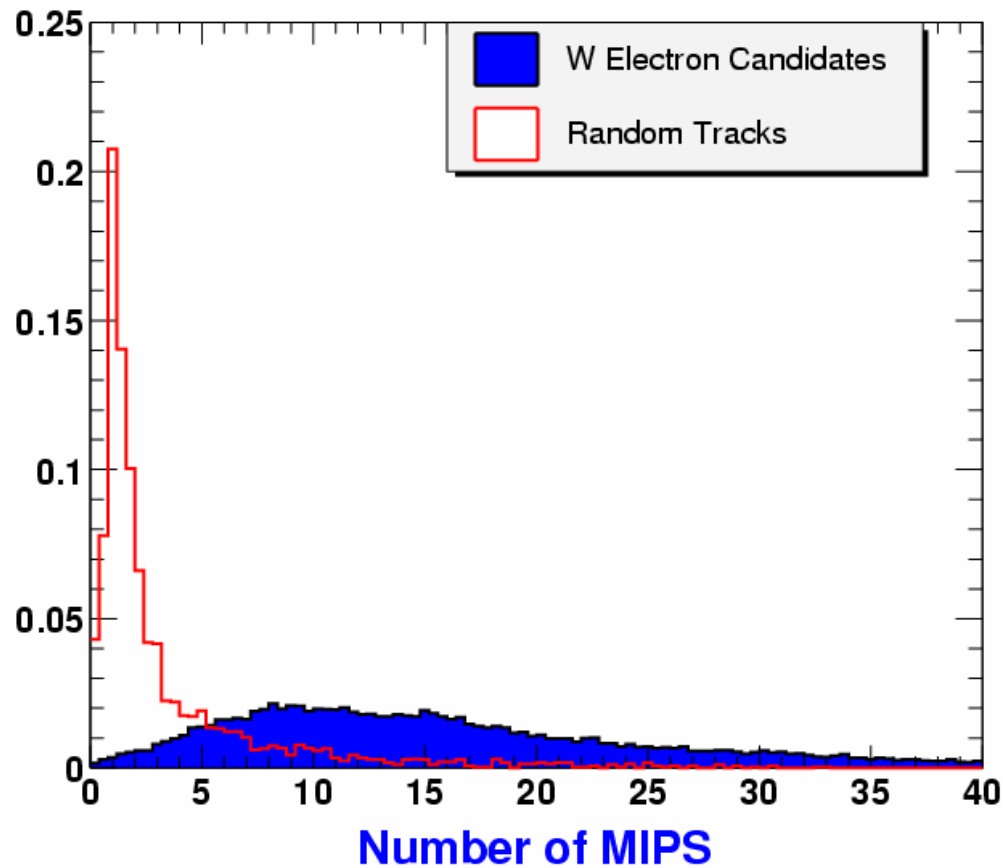


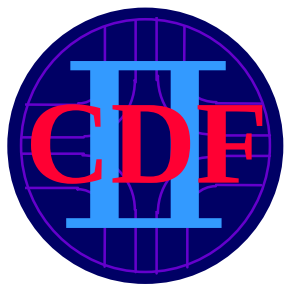
W Muon Candidates vs Random Tracks that Shower





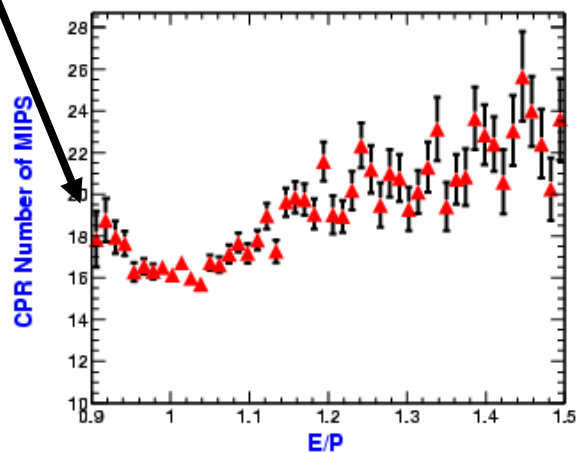
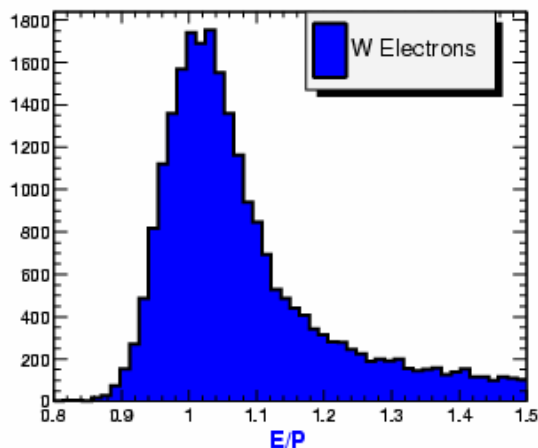
W Electrons vs Random Tracks





W Electrons

Shower energy
losses in
solenoid
material



Multiple photon
radiation +
photon
conversions