Inter Calorimeter Scintillators(ICS)

- Optics and Mechanics
  - Michigan State University
  - University of Texas at Arlington
- PMT's
  - Clermont-Ferrand
  - University Illinois
  - University of Texas at Arlington
- Electronics/DAQ
  - University of Chicago
  - Stockholm University
  - University of Rio de Janeiro

The Gap

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Design Concept

- Phi/eta cells
  - Use same Phi cells as TileCal (= π/32)
  - Gap Scintillator: 2 η cells
    1.0-1.1, 1.1-1.2
  - Crack Scintillator: 2 η cells
    1.2-1.4, 1.4-1.6
- Readout/Calibration
  - Use standard Tilecal PMT's/Readout (in Girder)
  - Calibrate with muons (+ Cs source for Gap Scintillator)
- Clear opticalfFiber is installed in Tilecal EB modules at same time as tiles/WLS fibers
  - Routed through the slots in ITC plug
  - Fiber cables plug into scintillator modules

Design Concept (cont.)

- Scintillators will be mounted to the Tilecal EB end plates after EB and LAr end calorimeters have been assembled.
  - Easy to handle, light-tight package
  - Assembled and tested at UTA/MSU

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Gap Scinillator (UTA design)

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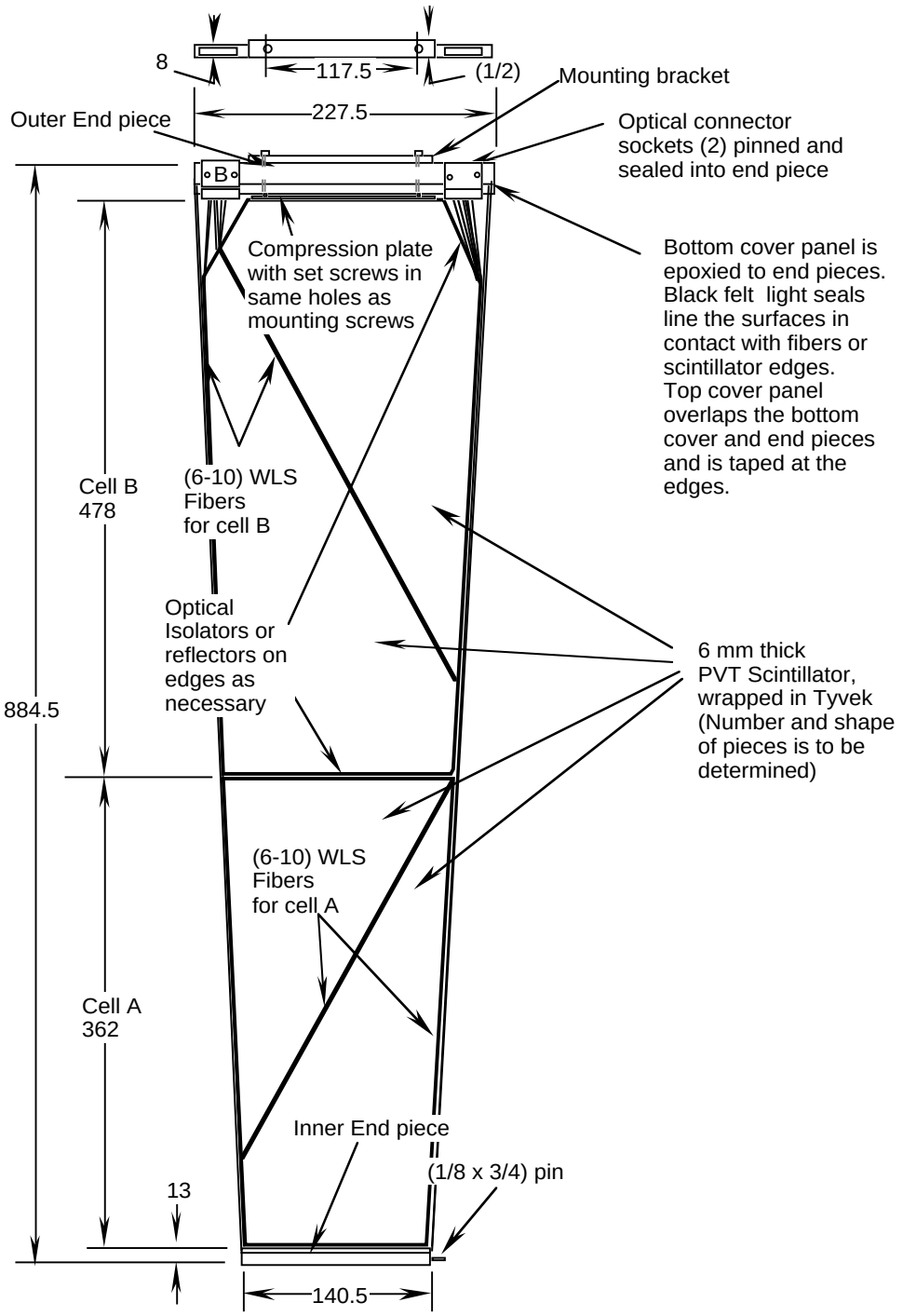
Crack Scintillator (MSU design)



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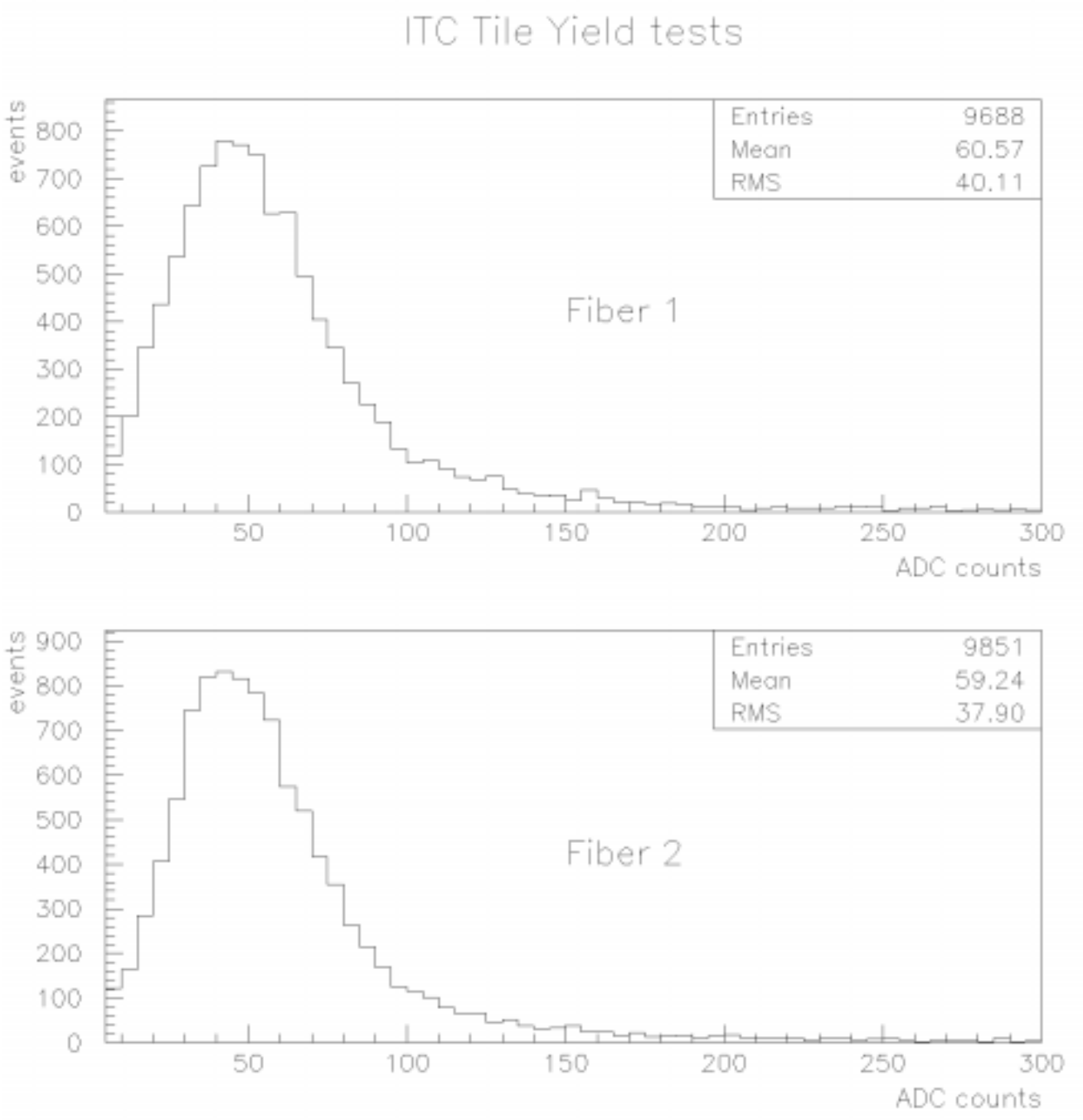
Light Yield (Gap Scintillator)

2 (0.9 mm) WLS Fibers x 2 Ends Directly or



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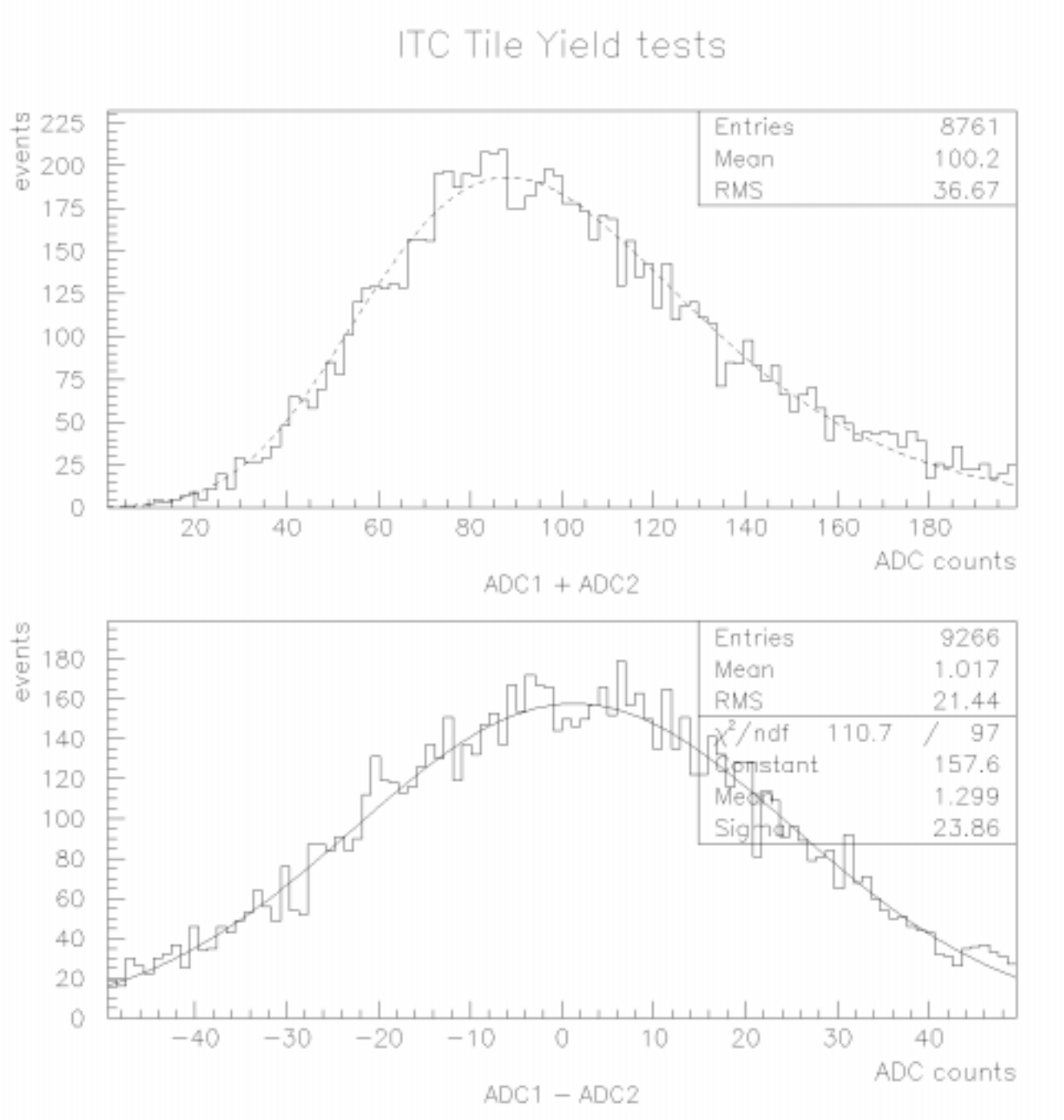
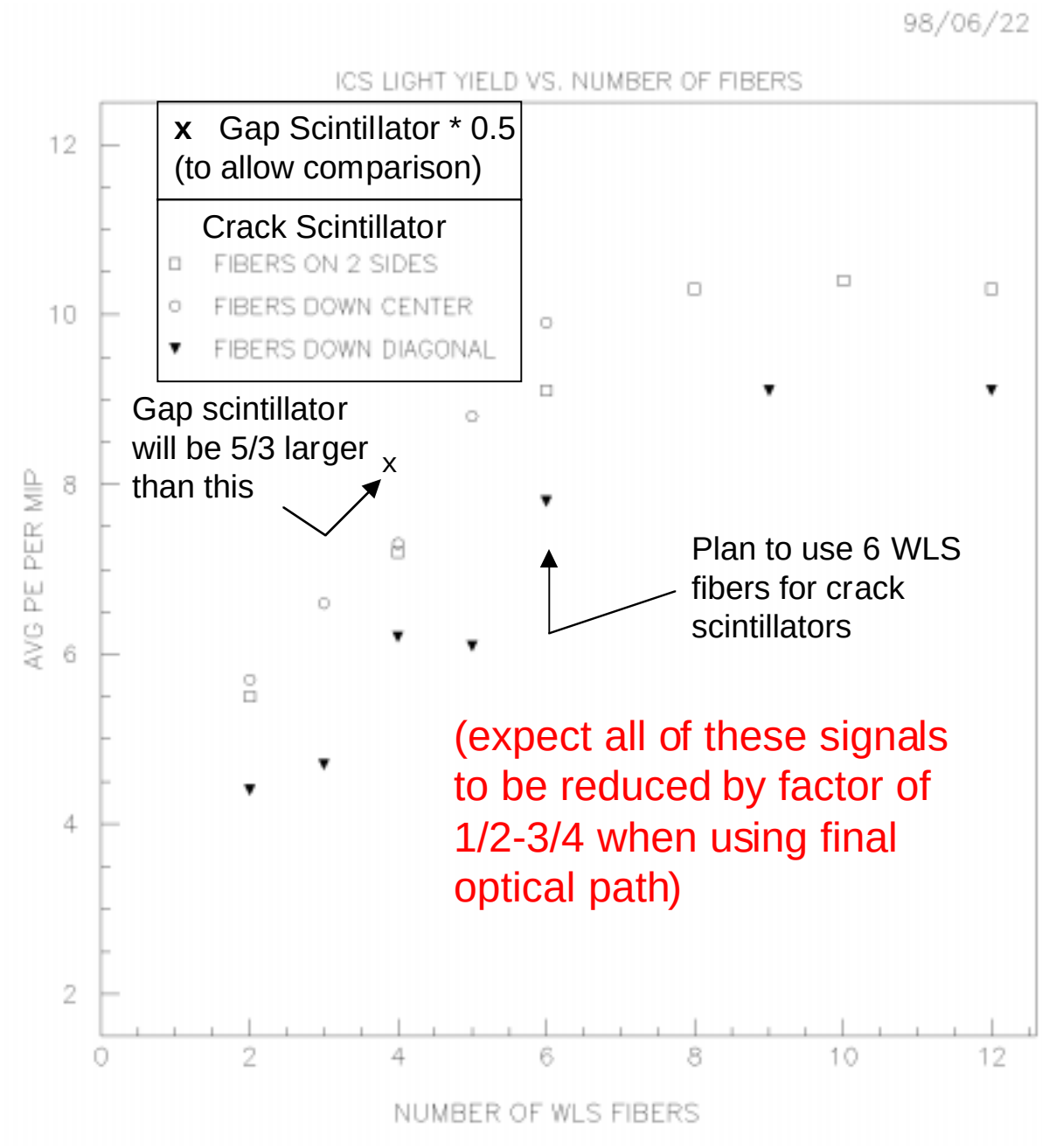
Light Yield (cont.)

$\langle n_{pe} \rangle = (\text{mean}/\sigma)^2 = (100.2/23.86)^2 = 17.6$

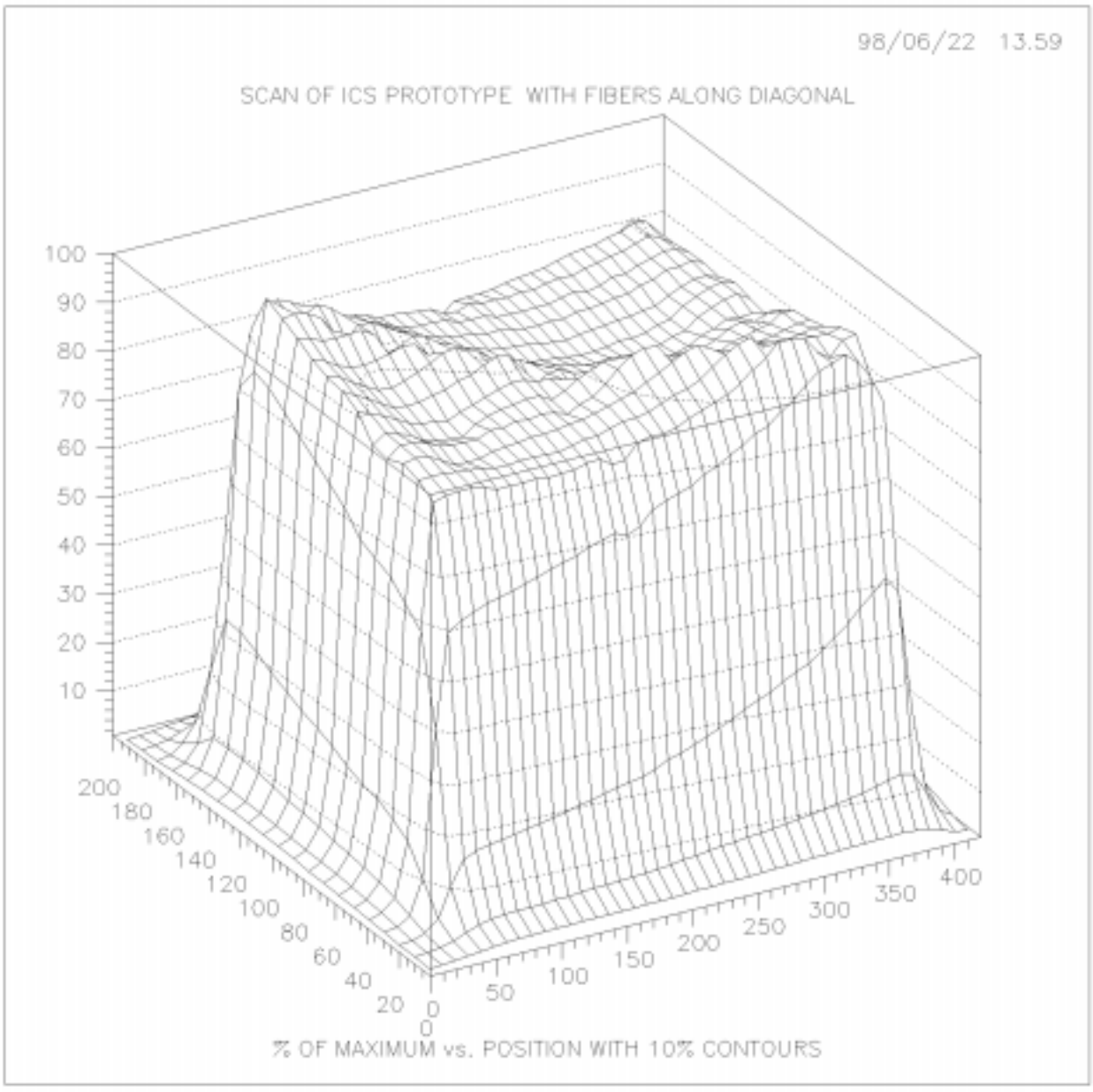


Light Yield (cont.)

Mirrored 1 mm WLS Fibers Directly onto PM



Uniformity- Cryostat Scintillators



Signal is constant (vs position) to ±10%

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Signal/Noise

- Use pedestal events and non hit cells in Module 0's test beam runs
- Find average noise of 16 MeV/PMT
- Calibration from electron data in test beam gives:
  0.85 pC/GeV = 50 photo electrons/GeV
  => 16 MeV/PMT = 0.8 pe/PMT
- Muon (MIP) Signal/Noise expected to be:
  Gap scintillator: 8 - 12
  Crack Scintillator: 4 - 7
- These numbers will be measured using prototype scintillator modules and actual optics this summer in the test beam

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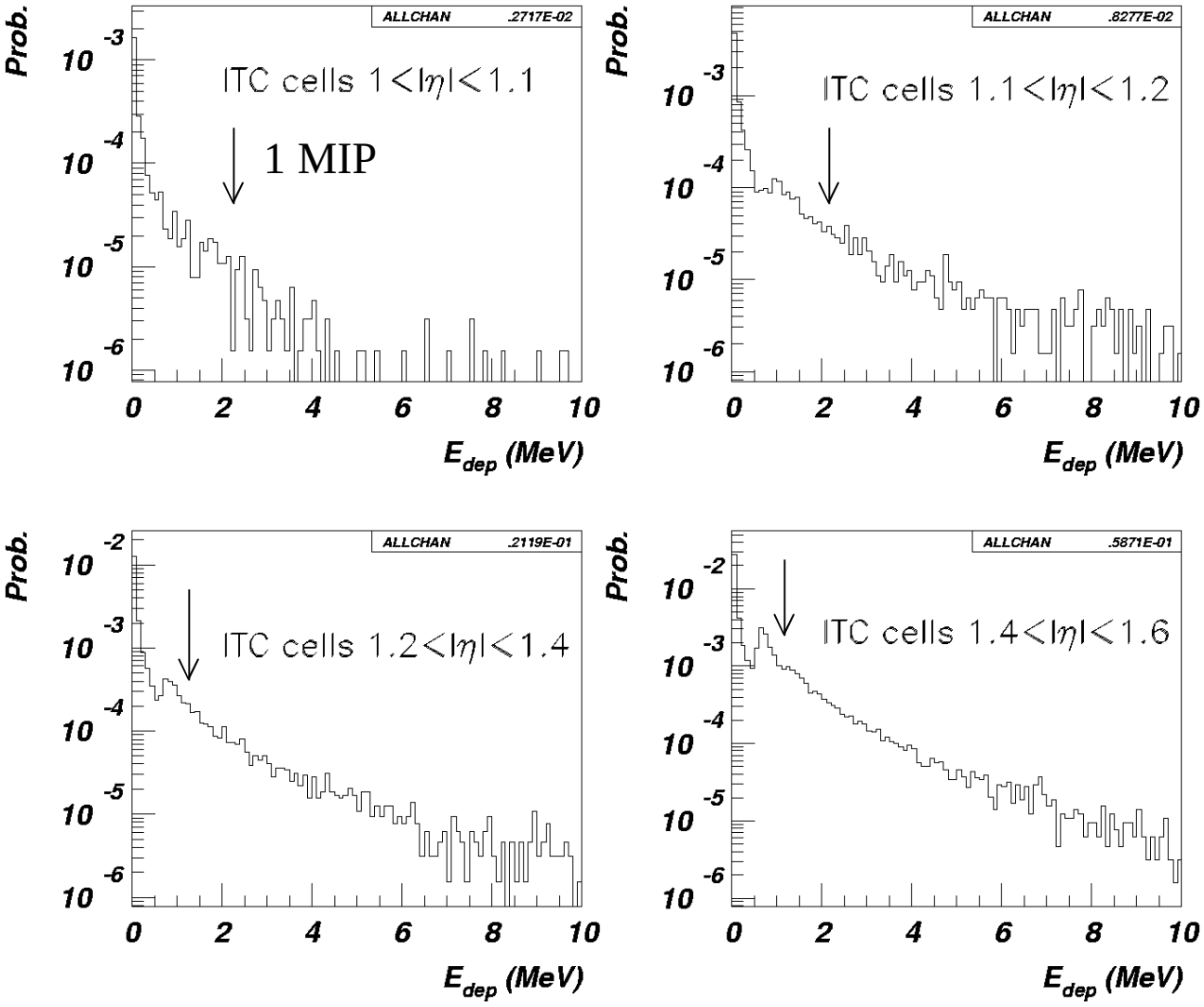
Min Bias Rates vs Energy Deposited (from Krzysztof Piotrzdowski)



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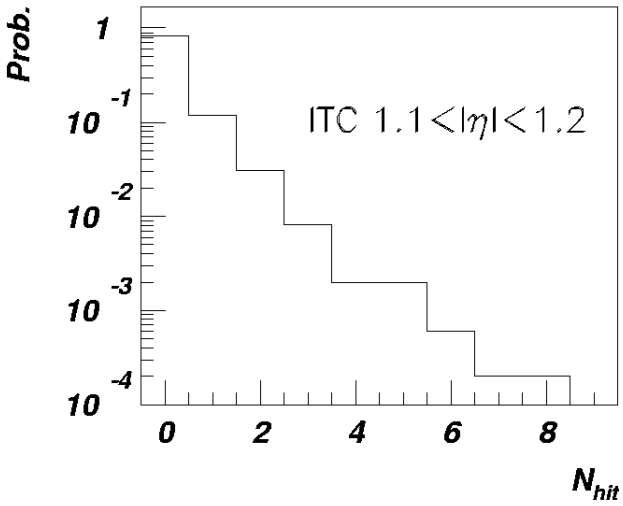
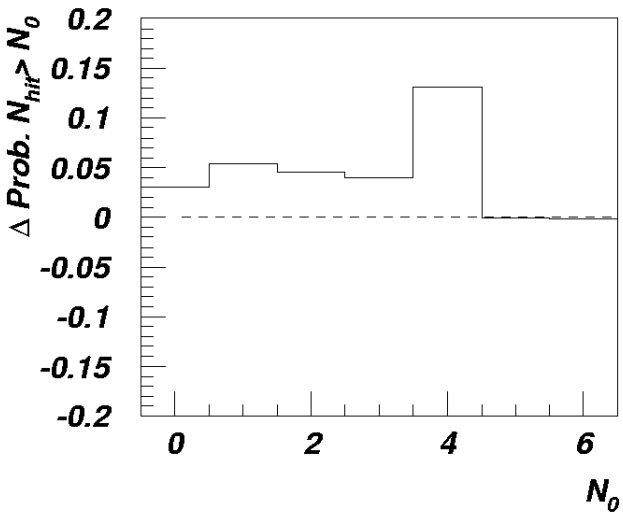
Min Bias Rates vs Hit Multiplicity (from Krzysztof)

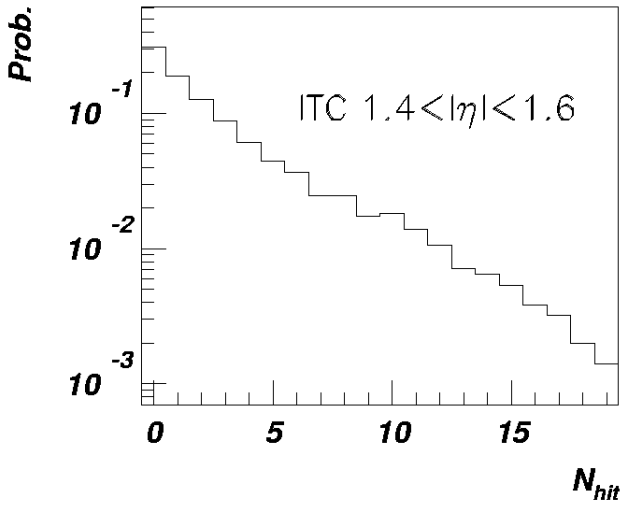
(Noise =< 0.25 MeV)

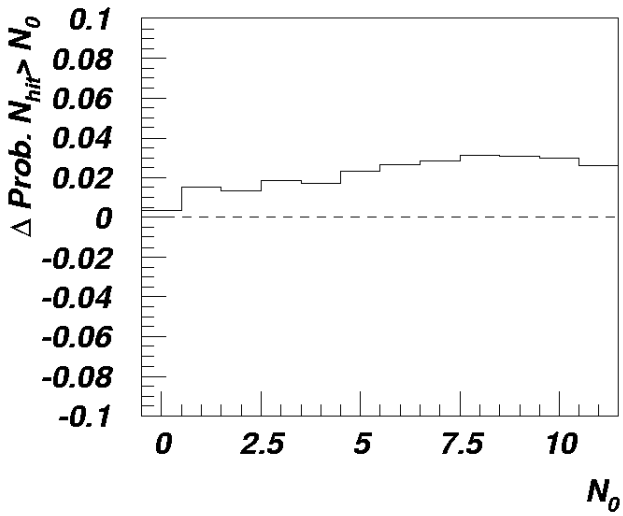
Threshold: 0.7 MeV = 0.4 MIP
Occupancy: 15%





Threshold: 0.5 MeV = 0.4 MIP
Occupancy: 70%





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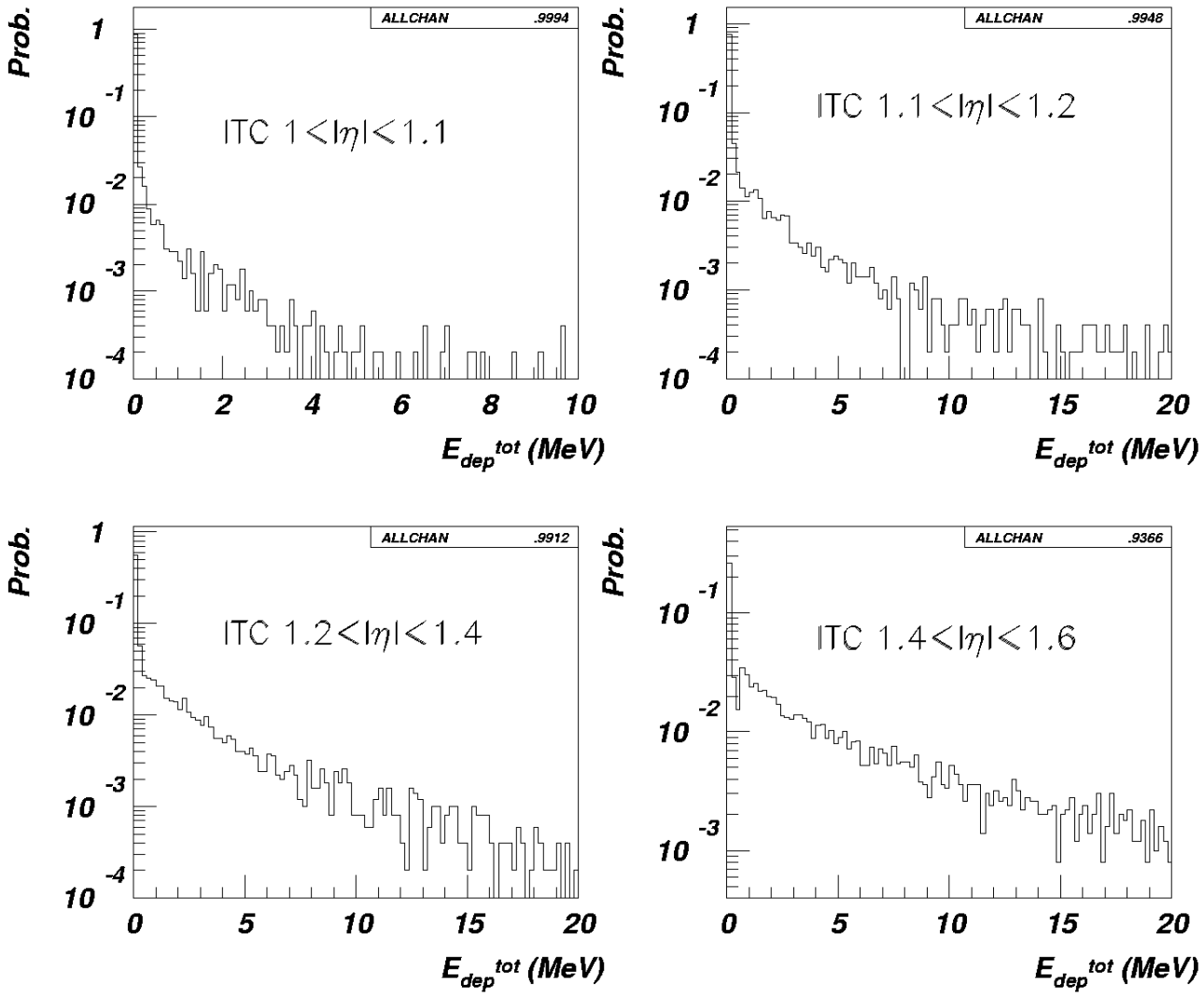
Min Bias Rates vs Total Energy (from Krzysztof Piotrzdowski)



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