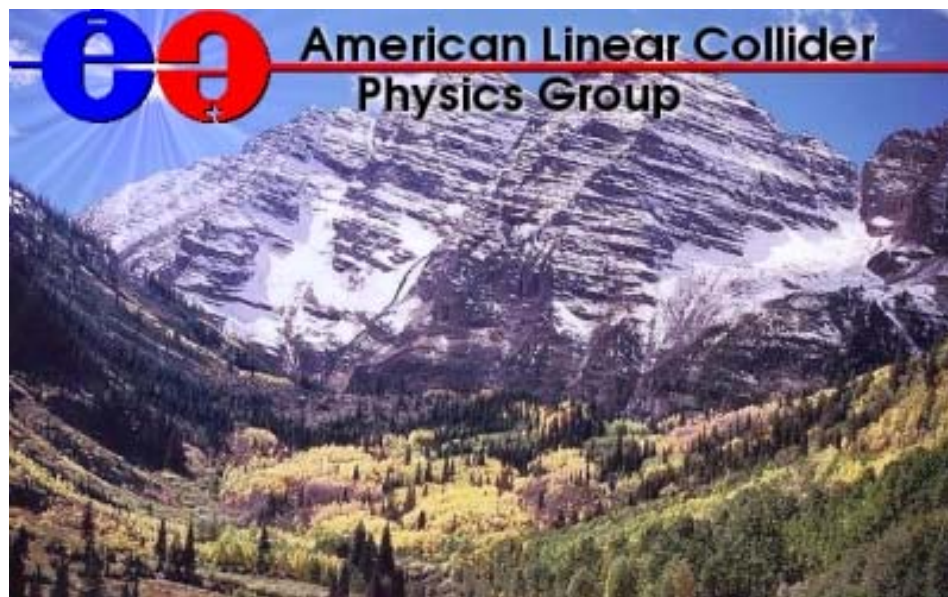


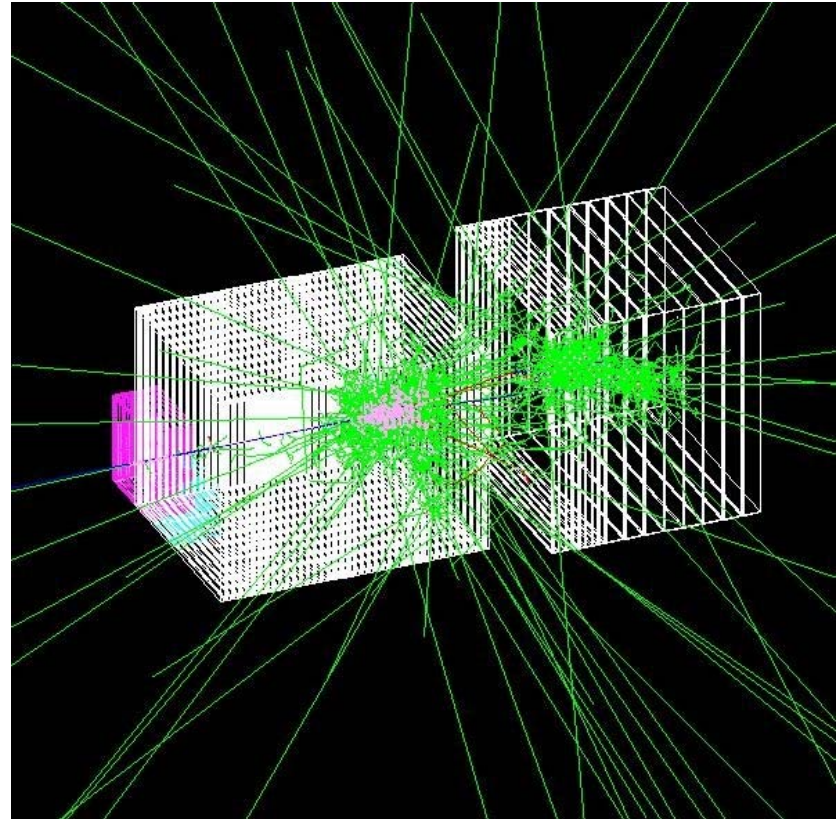
Status of The Tail-Catcher / Muon-Tracker for the CALICE Test Beam Module



Jerry Blazey
Northern Illinois University

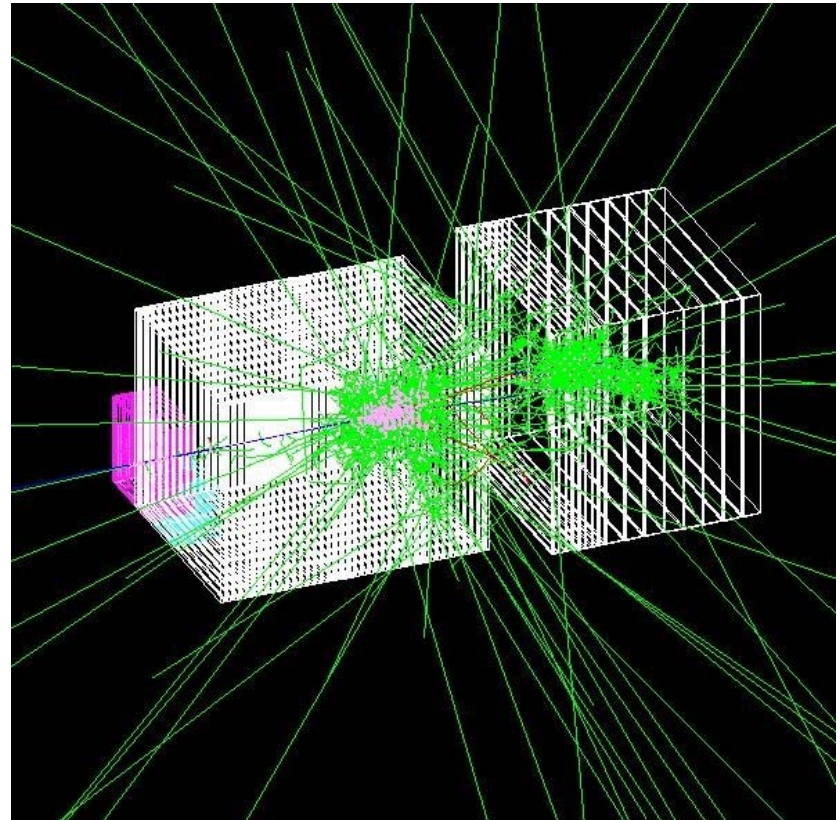
Goals for TCMT Prototype

- Study tail end of hadronic shower and validate simulations
- Prototype detector for generic LCD
 - Promote both eflow and muon identification
 - Correct for leakage
 - Understand and address impact of coil
 - Control fake rates



Vitals for TCMT Prototype

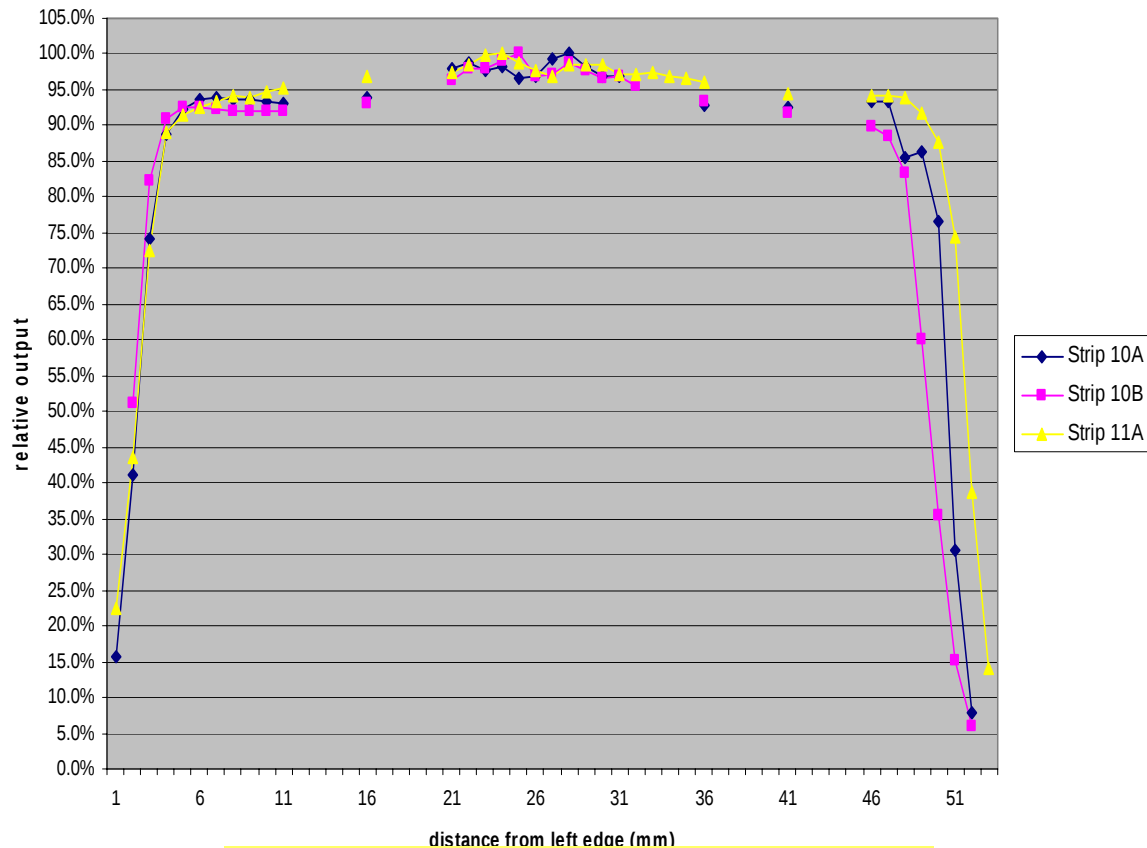
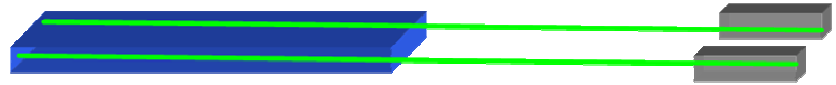
- **Mechanical Structure / Absorber**
 - “Fine” section (8 layers)
 - 2 cm thick steel
 - “Coarse” section (8 layers)
 - 10 cm thick steel
- **16 Cassettes:**
 - Scintillator Strips
 - 5mm thick
 - 5cm wide strips
 - Tyvek/VM2000 wrapping
 - Alternating x-y orientation
 - Readout
 - WLS Fiber
 - SiPM photo detection
 - Common readout with HCAL
- **Dimensions:**
 - Length (along beam) - 142 cm
 - Height - 109 cm
- **Weight ~10 tons**



**Design complete
Construction Starting Soon
Thanks to Fermilab**

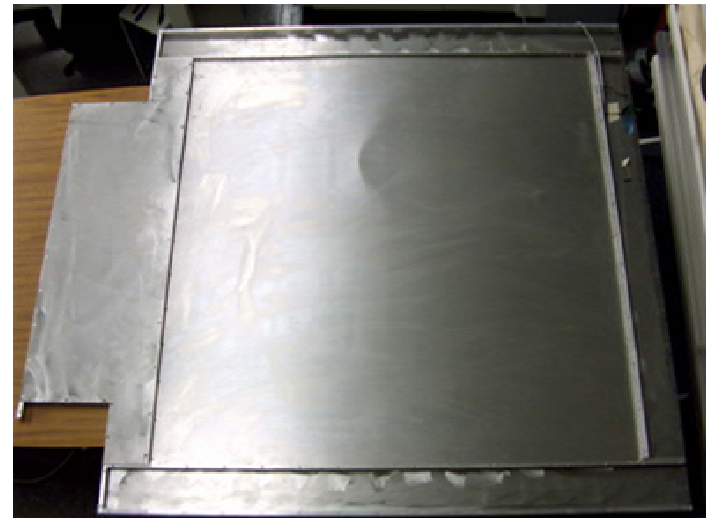
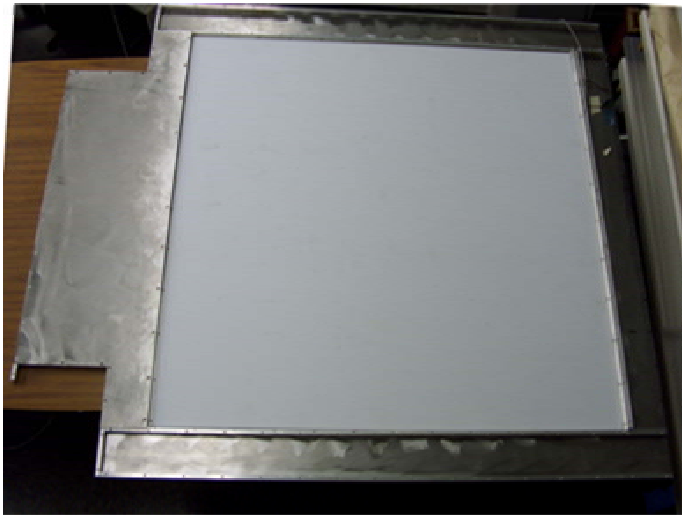
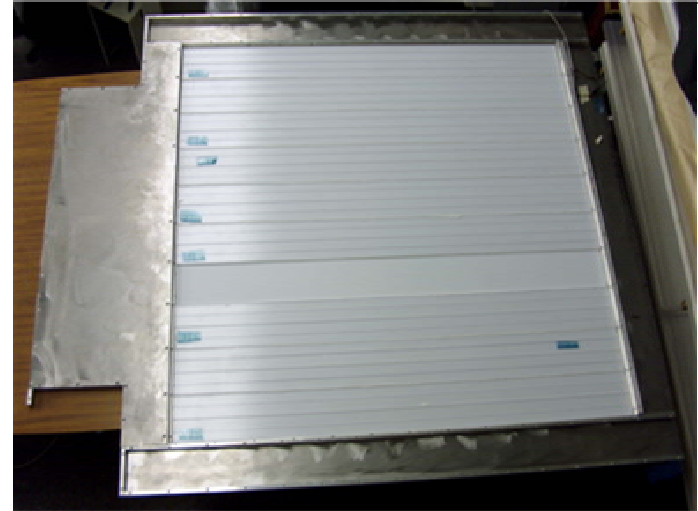
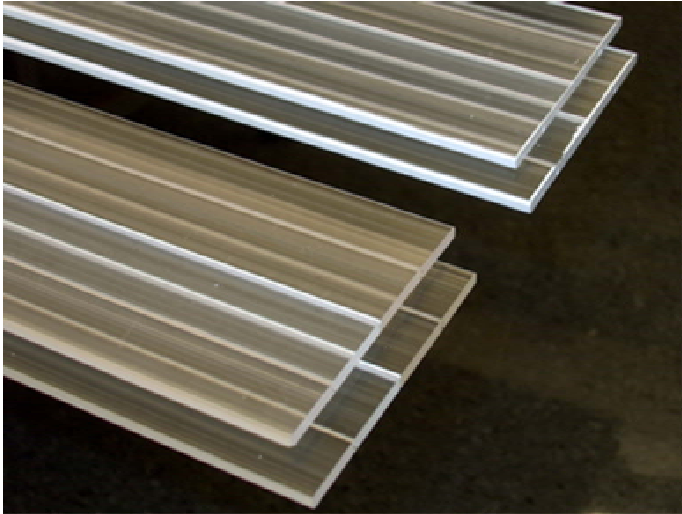
Cassettes: Scintillator Strips

NICADD/Fermilab Extruder

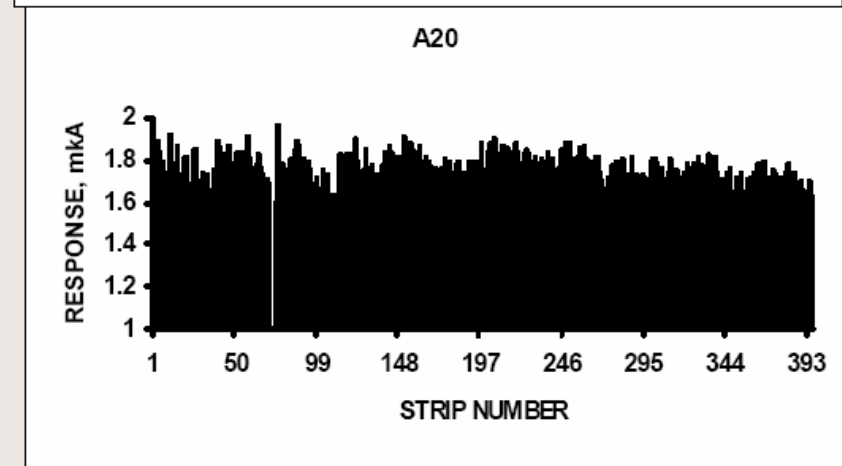
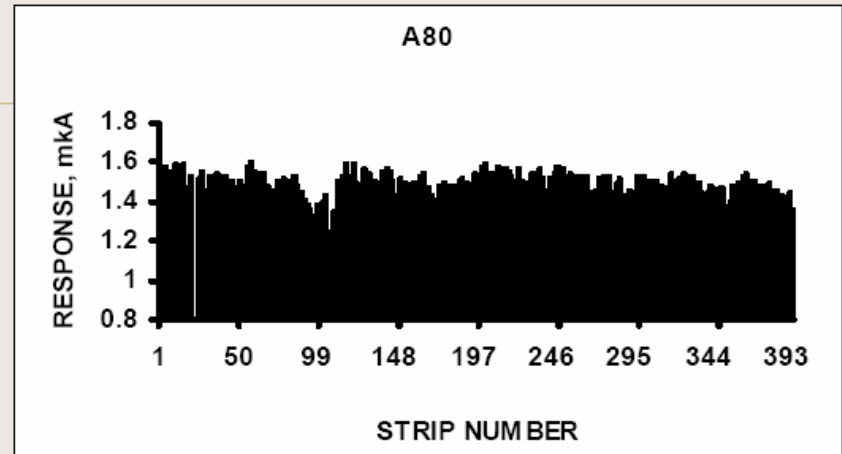
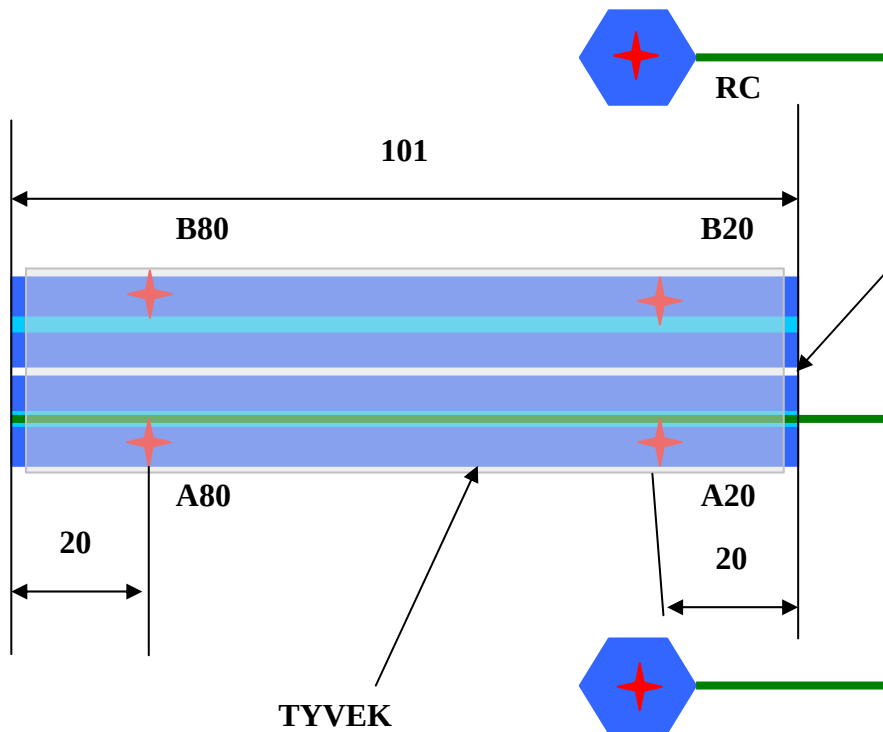


Uniformity:
~5 % across strip
~strip-to-strip

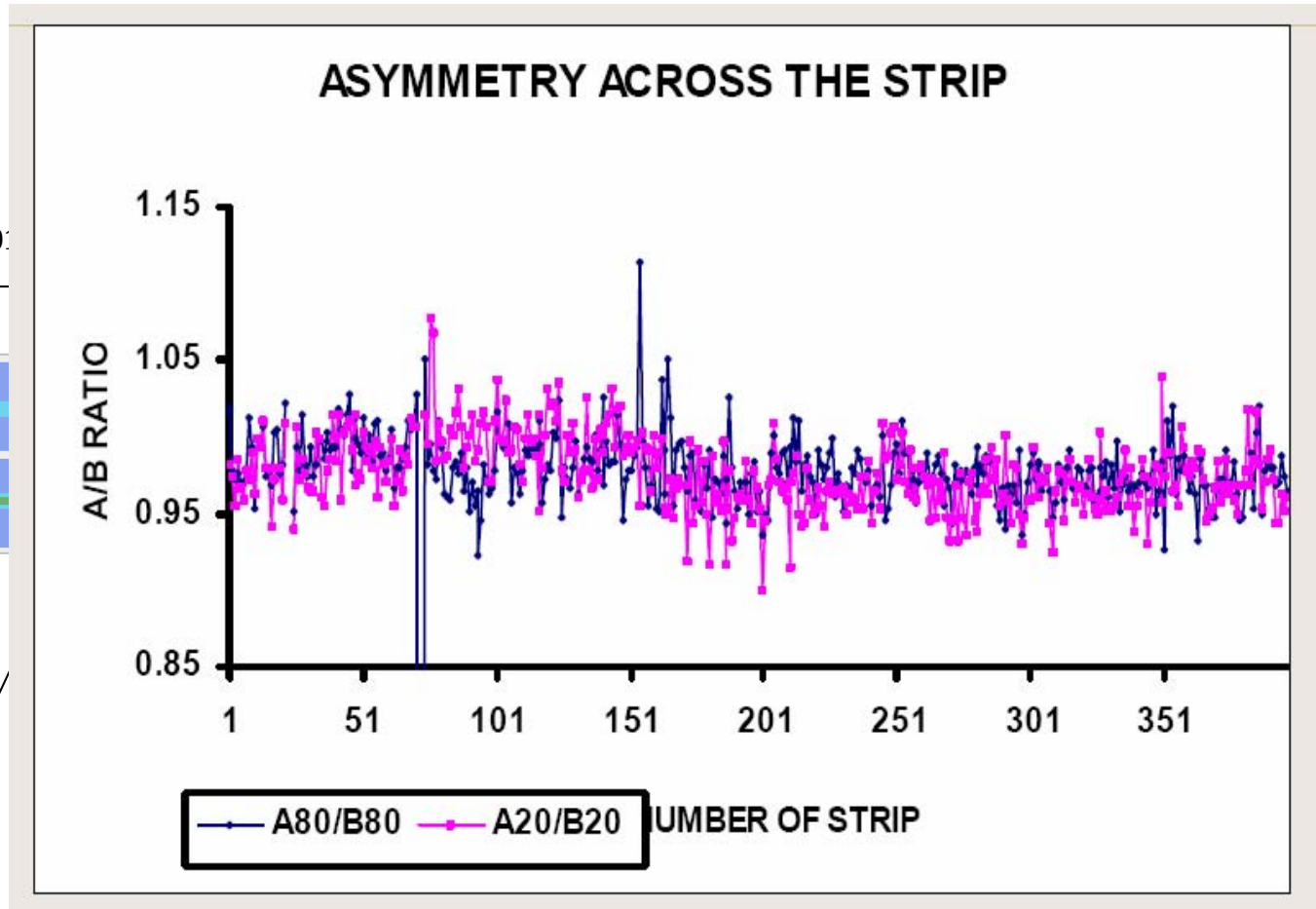
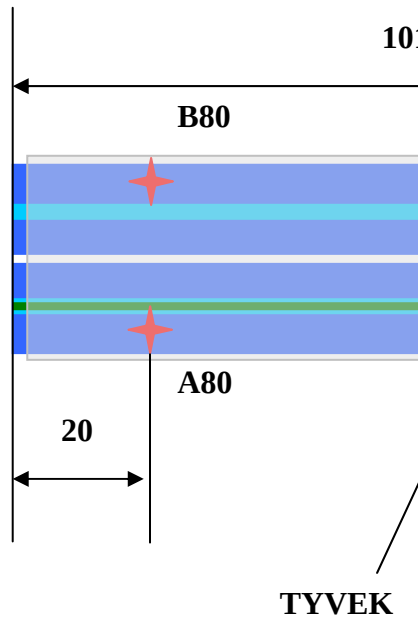
Cassettes: Mech. Prototype



Cassettes: Strip QC

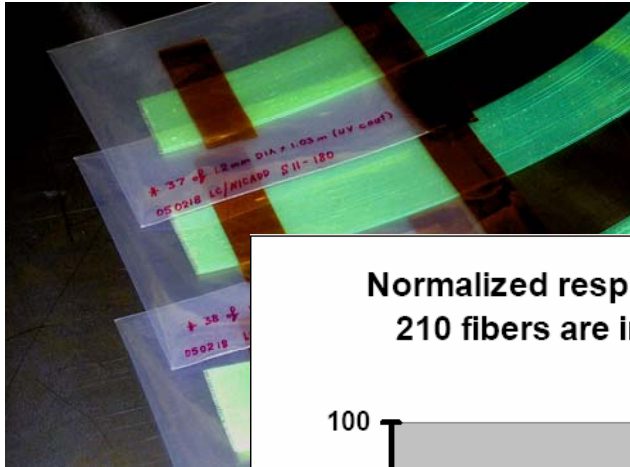


Cassettes: A Finer Look @ Strips

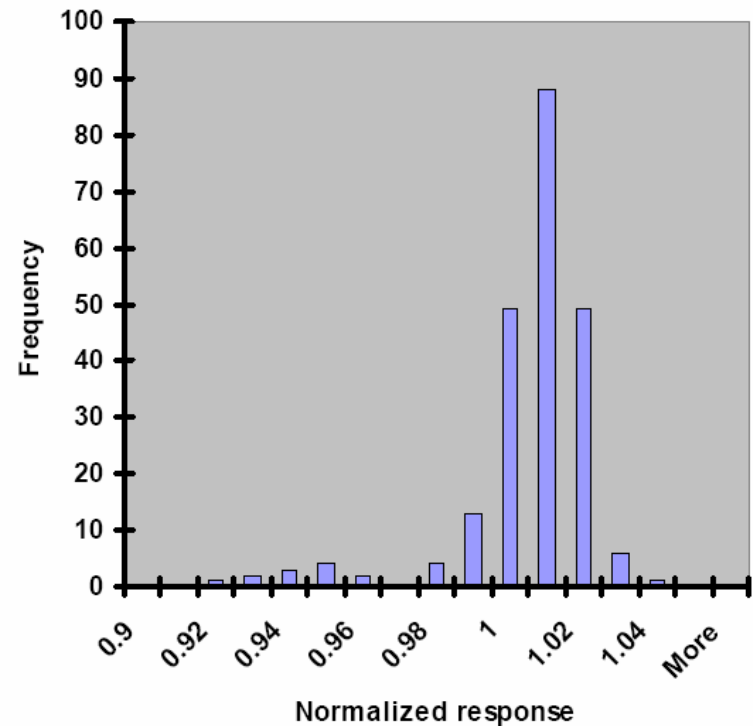


Cassettes: Fibers & QC

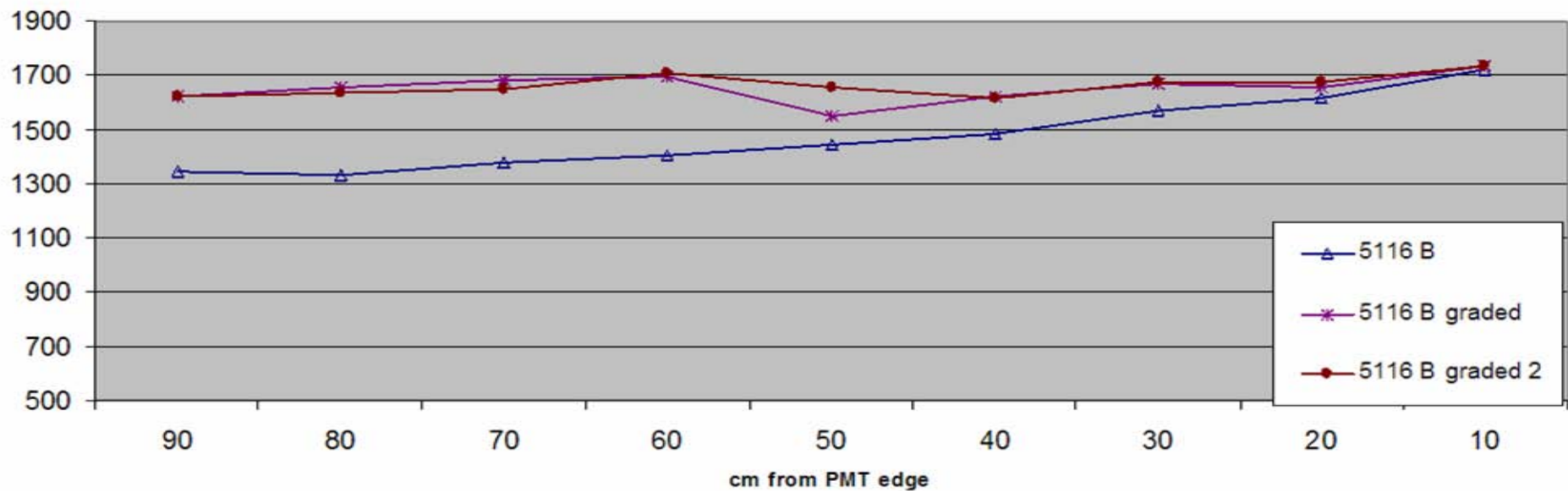
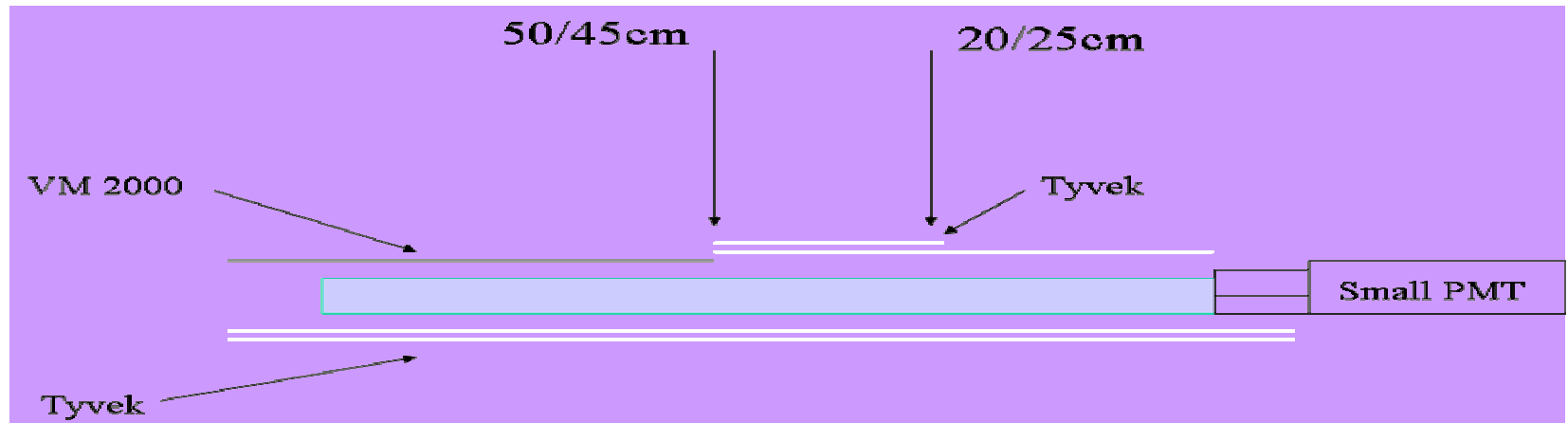
- Kuraray Y-11
 - Multi-clad WLS,
 - OD = 1.2 mm
 - Length = 1.03 m
 - Polished ends
 - One end mirrored
-
- QC reference system repeatability 0.25 %
 - 0.5 % outliers with response below 92 % of average.
 - 94 % fibers in peak with σ less than 1 %.



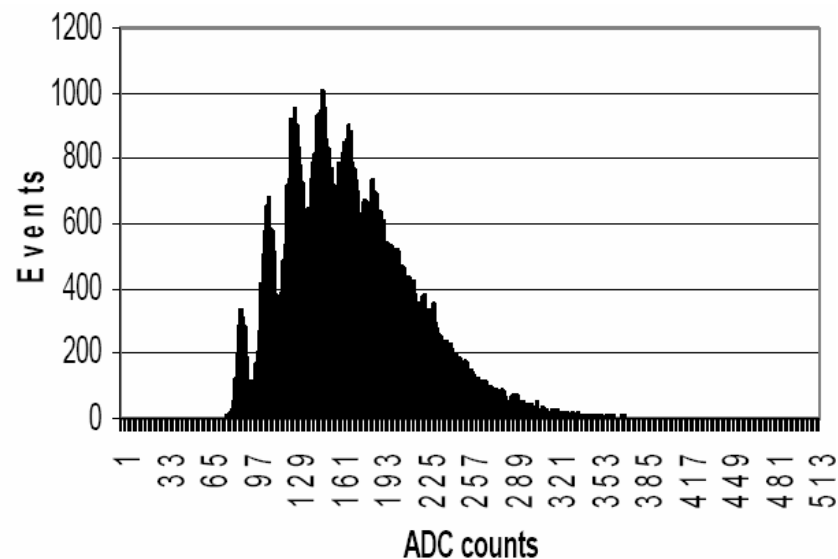
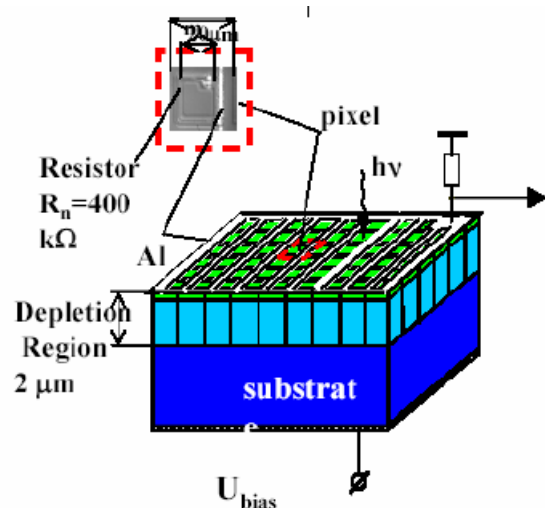
Normalized response of 222 fibers.
210 fibers are in the peak (94%)



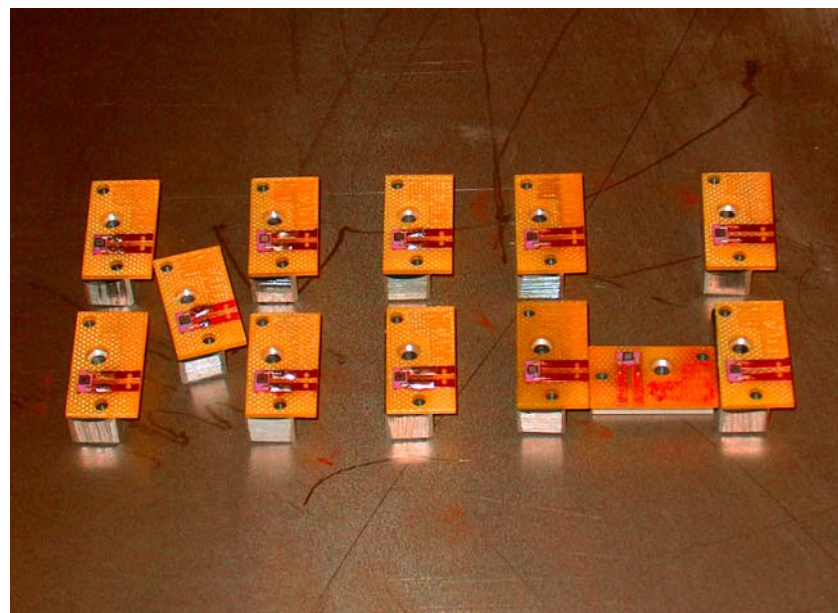
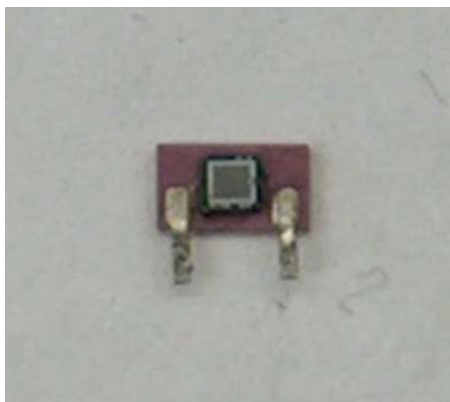
Cassettes: Use of Reflector to Improve Uniformity



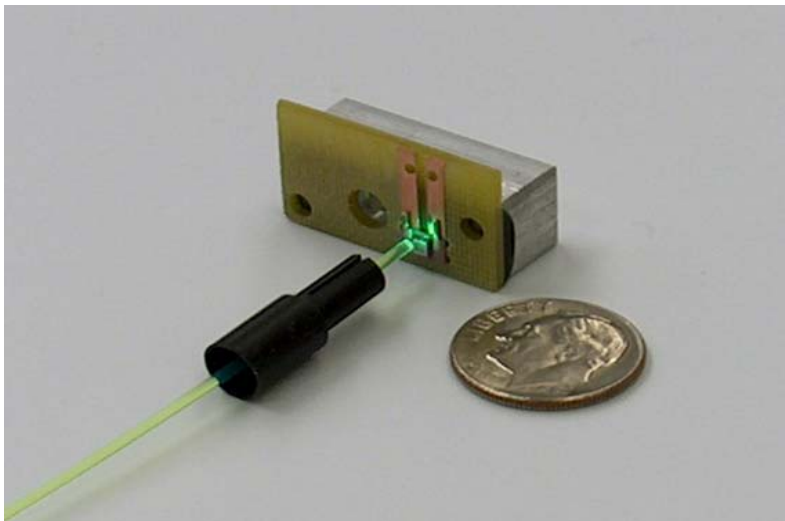
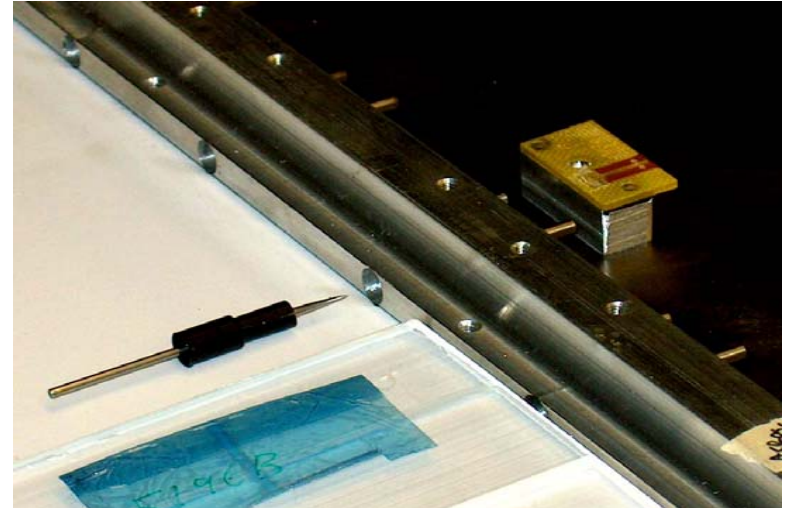
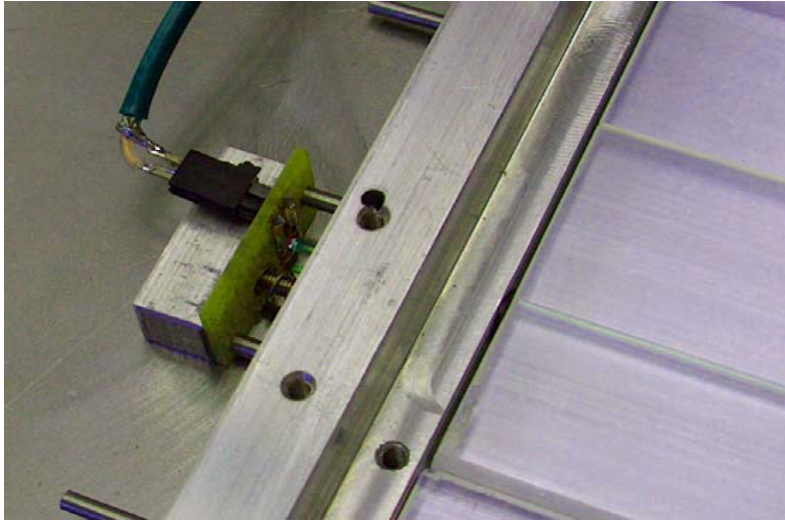
Cassettes: SiPM readout and holders



~1000 pixels on 1mm x 1mm
 Bias voltage ~ 50-60V
 Gain ~ 10^6
 Quantum x geom ~ 12-15%



Cassettes: Fiber-Photodetector Matching



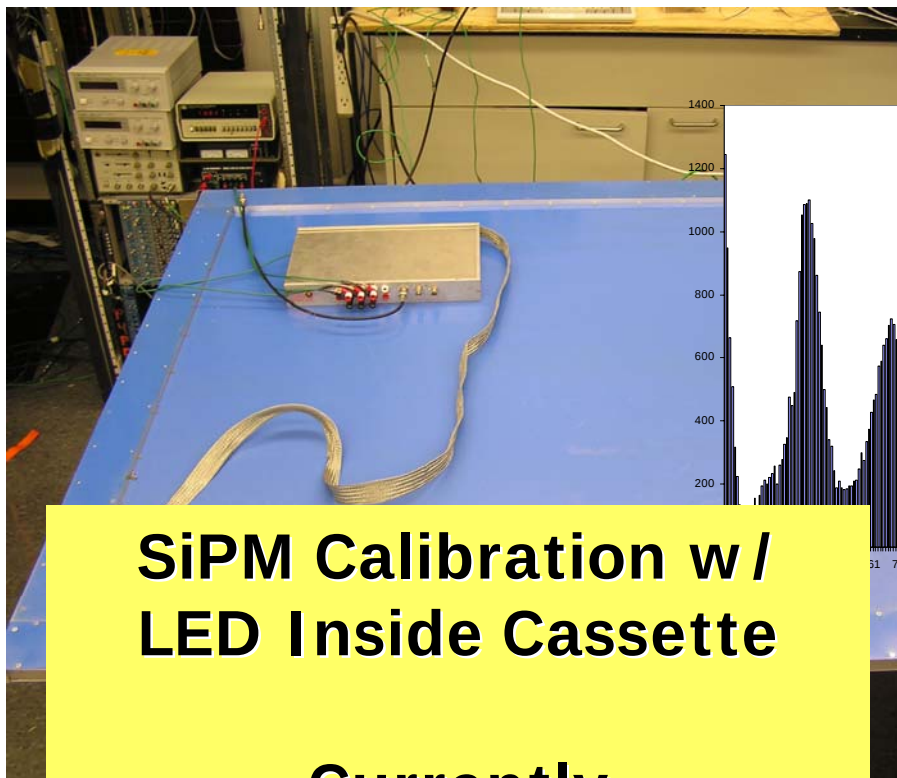
Cassette Production*



**Production:
4 Complete
19 Complete mid-Sept**

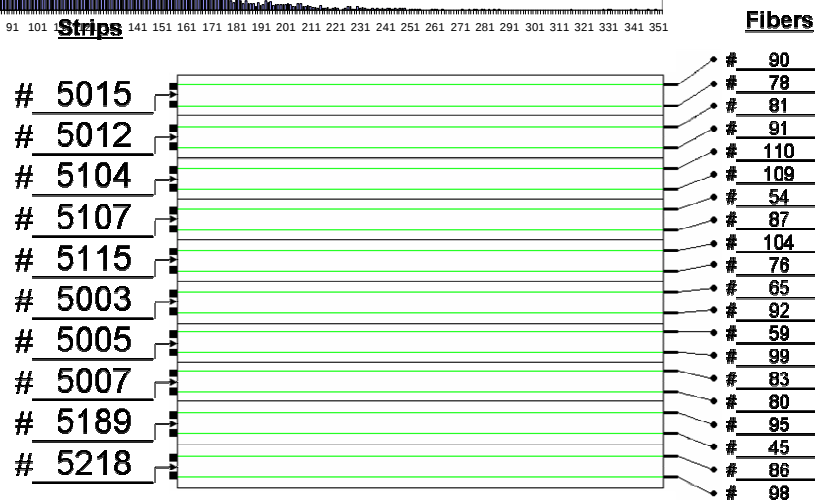
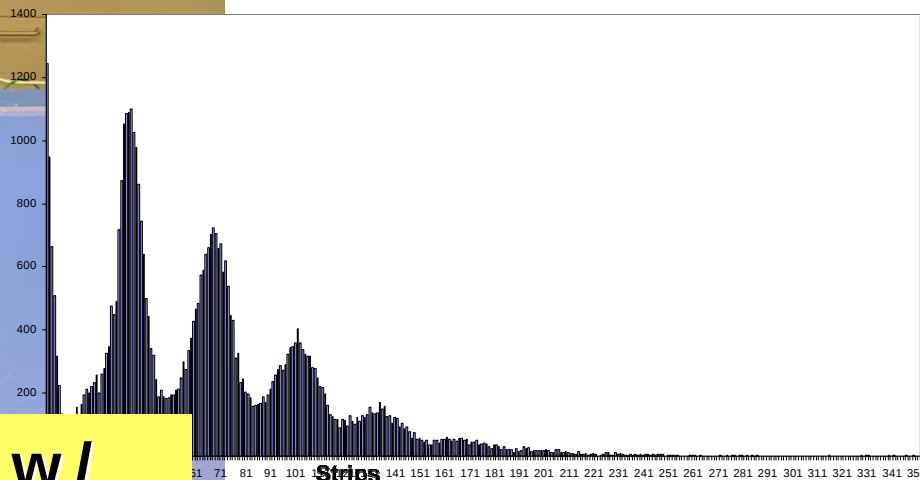
***w/o SiPM**

Cassettes: Commissioning & Keeping Track



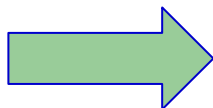
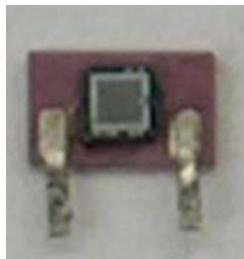
**SiPM Calibration w/
LED Inside Cassette**

**Currently
Commissioning 1st
Cassette w/ cosmics**

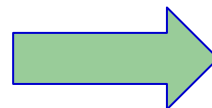
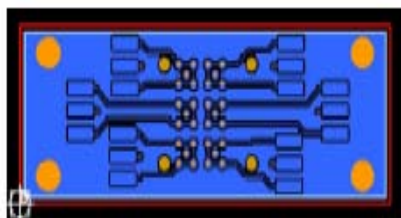


Electronic Components

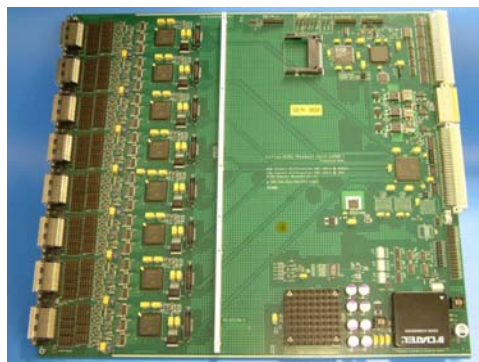
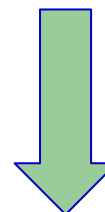
320 SiPM



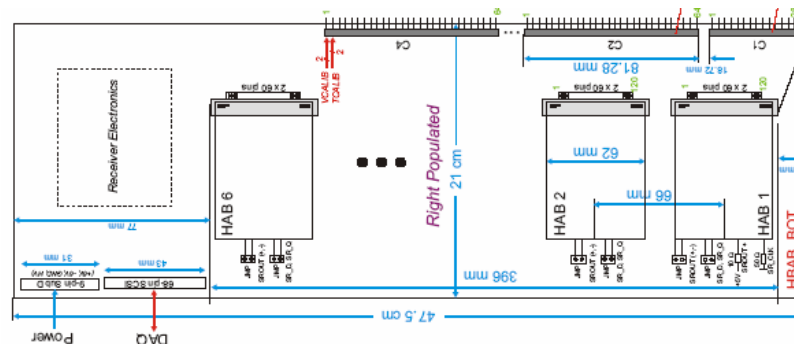
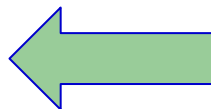
64 Connectors
6 channels/conn.
4/cassette



4 Adapters
108 channels/adapter



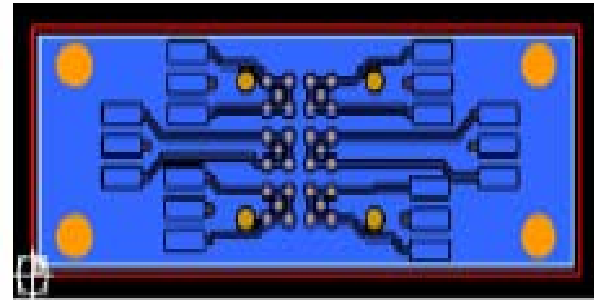
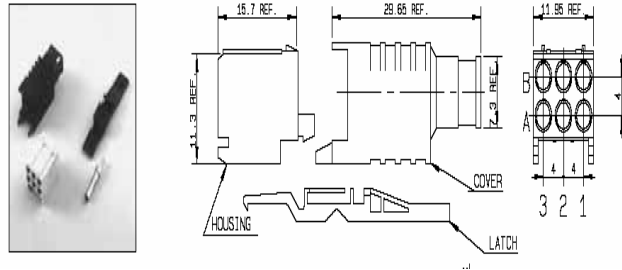
1 DAQ Board



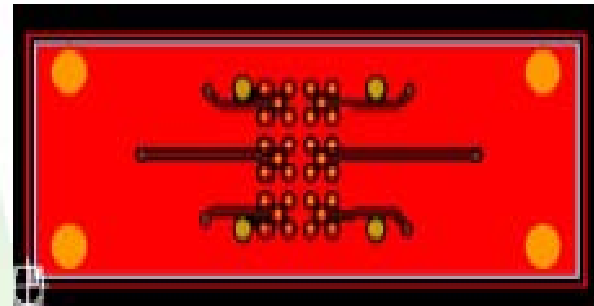
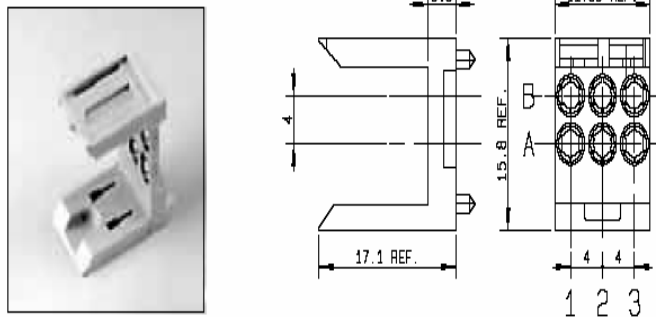
4 HCAL Base Board

Readout: Cable / Connectors

STRAIGHT FEMALE KIT FOR CABLE ASSEMBLIES

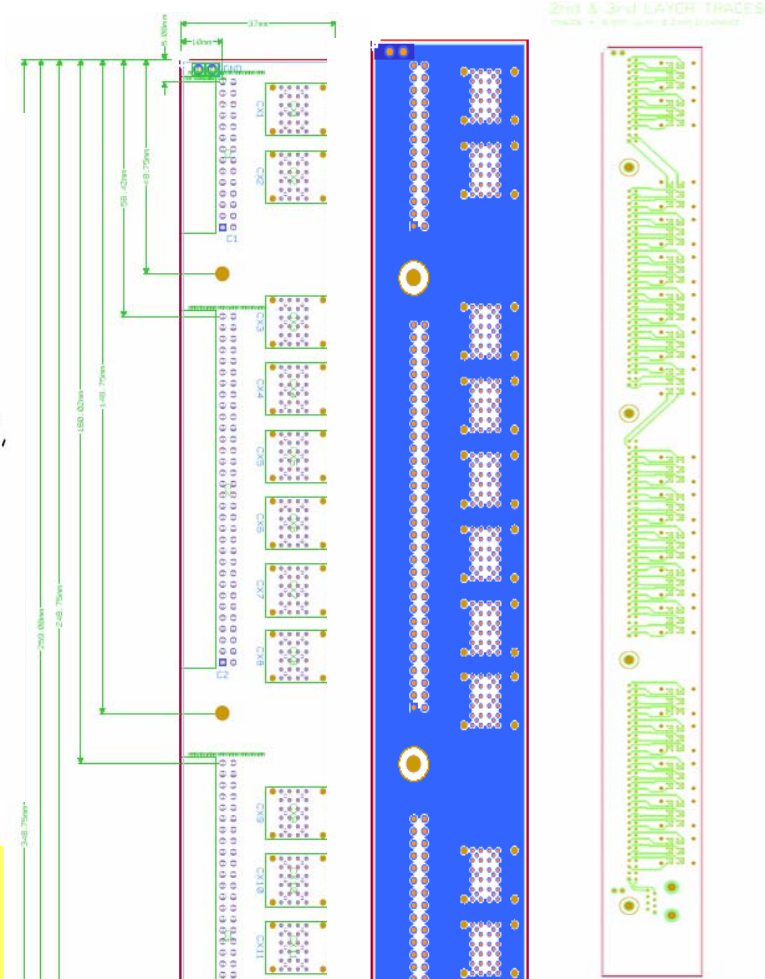
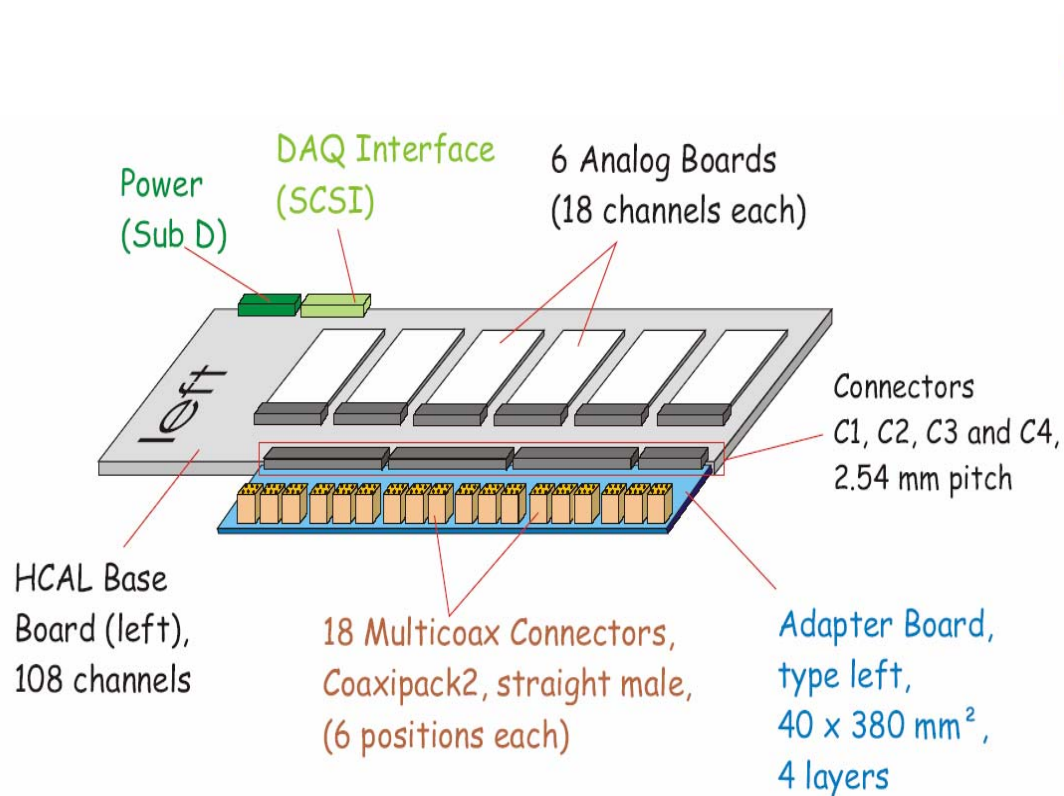


STRAIGHT MALE HOUSING



**Multi Coax Connectors all in hand
Thanks to T. Wesson / Fermilab**

Readout: Front End and Adaptor Board Layout



Concept: Concept by M. Reinecke (DESY)
Adapter Board Layout Complete
Thanks C.Needles/Fermilab

Summary

- **TCMT making excellent progress**
- **Mechanical Structure / Absorber**
 - Design complete
 - Starting construction
- **Cassette**
 - Uniformity acceptable
 - production complete by September
 - Cassette commissioning underway
- **Electronics**
 - Interface w/ CALICE HCAL in design / production
 - Awaiting arrival of full SiPM
- **Should be ready for beam 2006.**