

# Short-long fibers module



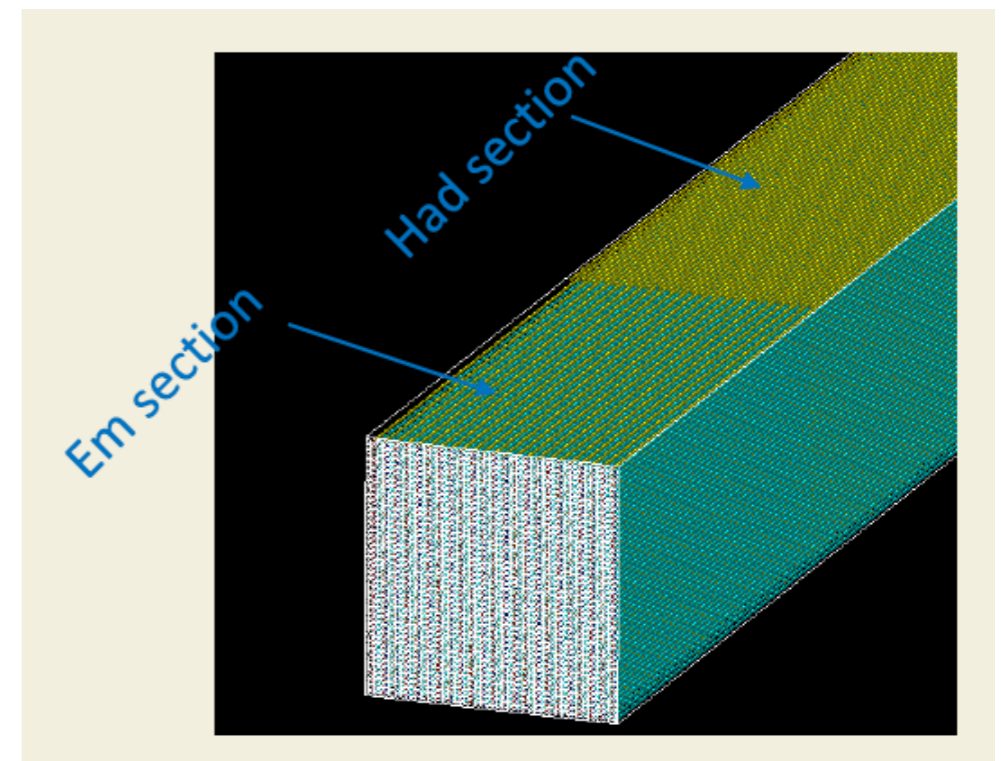
Roberto Ferrari, Gabriella Gaudio, Lorenzo Pezzotti

RD\_FA Pavia  
WP: Calorimetria

RD\_FA collaboration Meeting  
5-6 luglio 2018

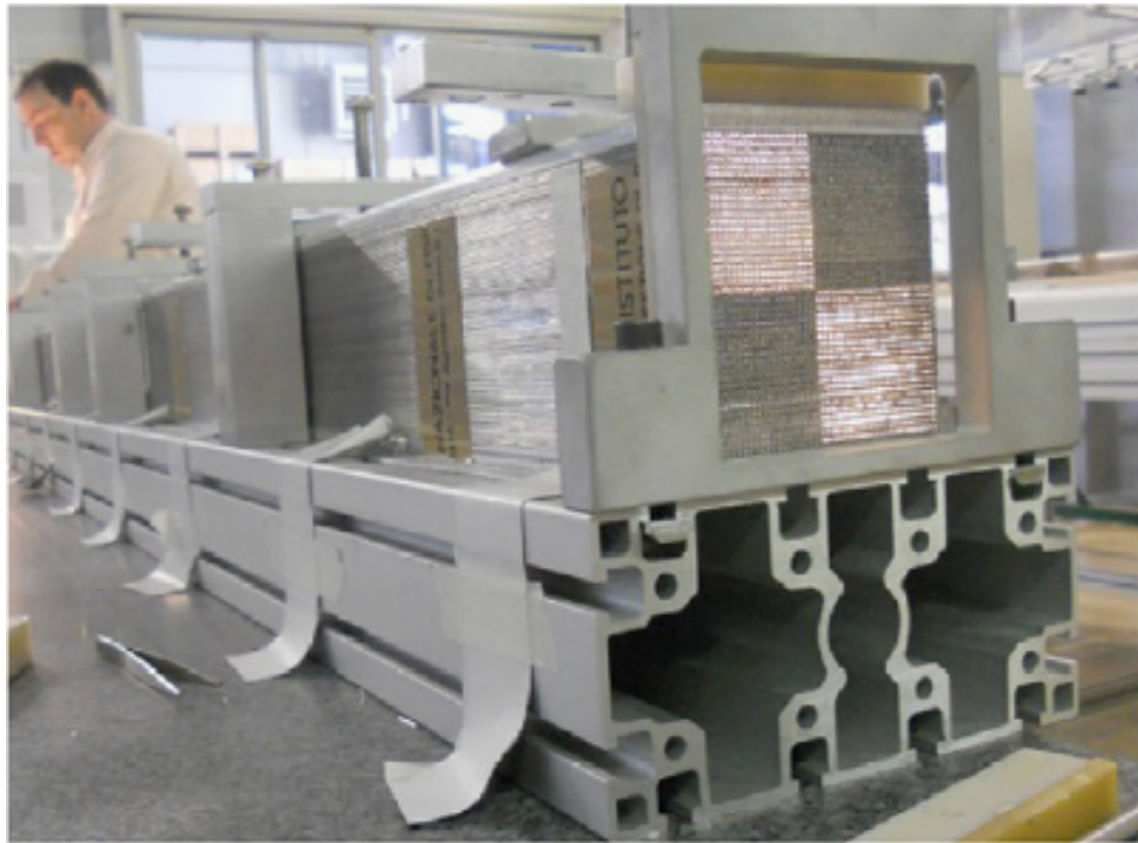
# Physics Motivation

- ◆ Unsegmented Dual Readout fiber calorimeter has proved to provide
  - ◆ Good electromagnetic and hadronic resolution
  - ◆  $e/\pi$  discrimination (using shower shape, timing information, C/S...)
- ◆ Short/long fiber arrangement will allow:
  - ◆ Better discrimination between elm and had shower
  - ◆ Better identification of elm component in jet



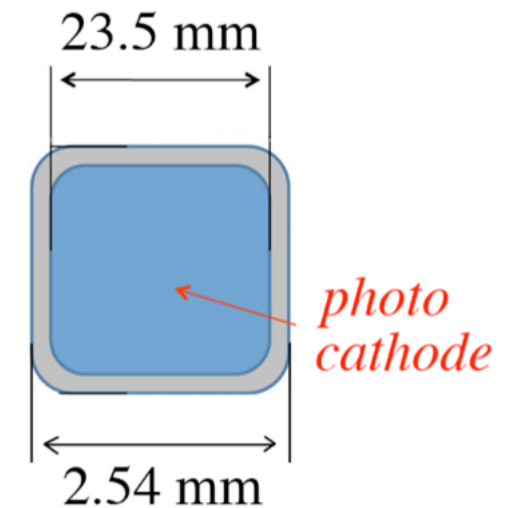
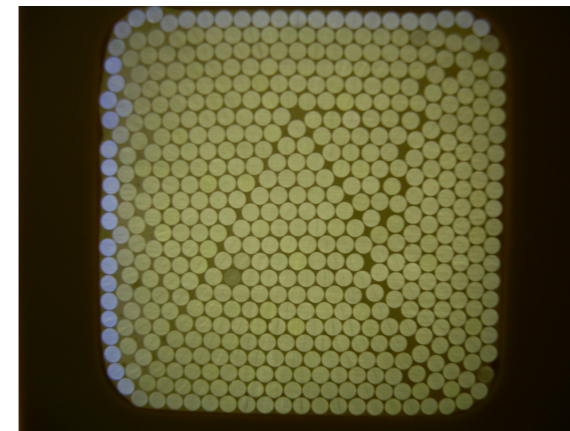


# Calorimeter Prototype

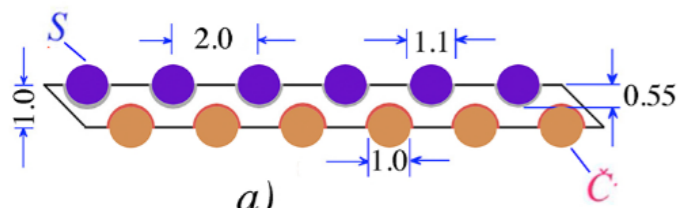


4 towers:

| Cherenkov + | scintillating channel each



*Hamamatsu R8900*



R8900 UBA

R8900(U)-100 SBA (350nm)

- Lead plates 93x1x2500 mm
- Clear fibers
- Scintillating fibers

Yellow filter for scintillation:  
transmission 7% at 425 nm, 90% at 550 nm.

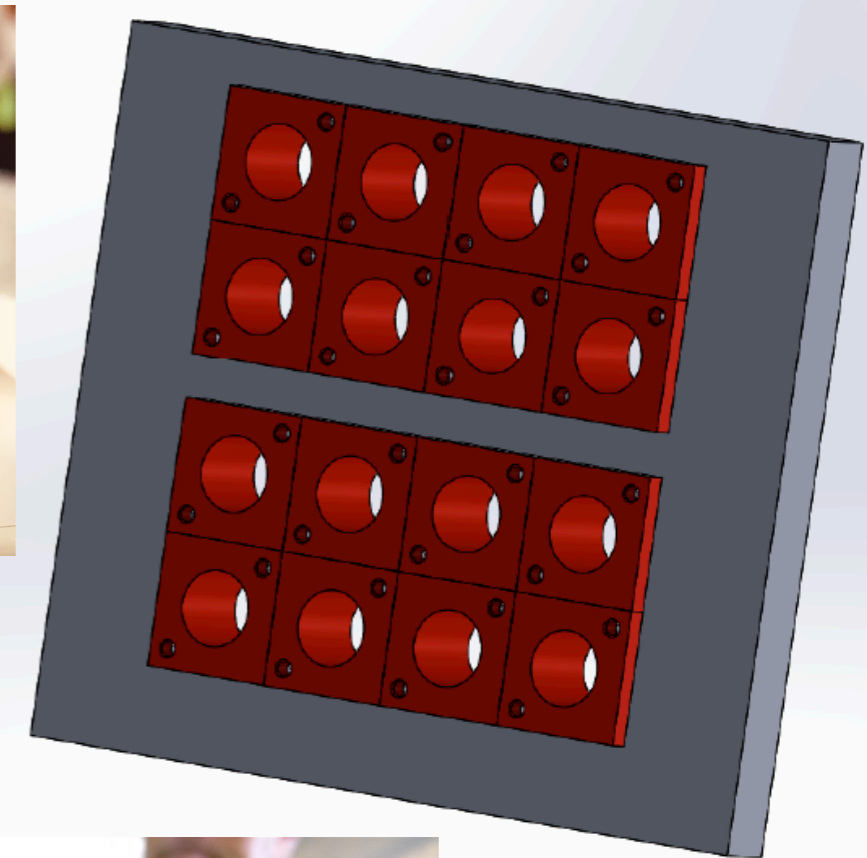
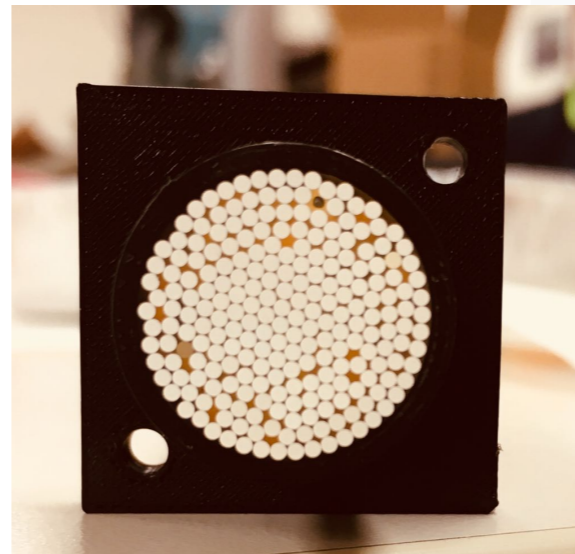
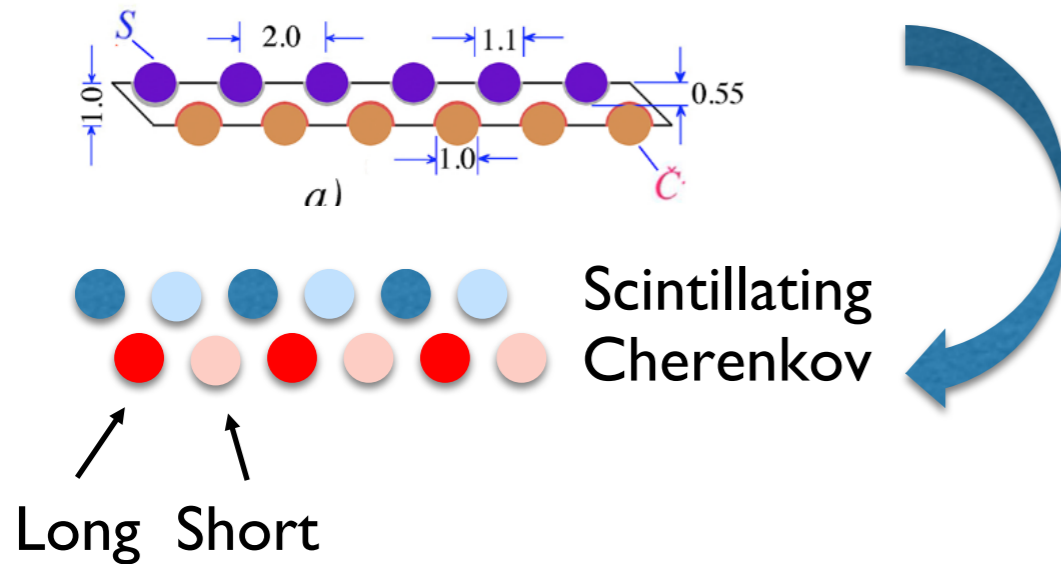


# RD52 calo @ LENA





# Calorimeter refurbishing



- ◆ Re-piling up of plates and fibers
- ◆ Displacement of fibers (long-short arrangement)
- ◆ Bundling and milling end face of fibers
- ◆ New coupling structure to PMT holder



# Setting-up @ H8 Testbeam

- ◆ Stand-alone measurements in September TB
- ◆ Positioning on moving/rotating platform
- ◆ Use standard ancillary detectors
- ◆ Use electronic card (filtering + impedance adapter)
- ◆ ADC readout
- ◆ Parallel DRS readout



# Detector Calibration

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- ◆ Module calibration (standard procedure)

NIMA 735 (2014) 130–144

- ◆ Channel equalization

- ◆ 20 GeV electron steered in each tower center

- ◆ Average signal (adc counts) equalized

- ◆ Calibration (GeV/ Adc\_counts)

- ◆ Steering beam in module center

- ◆ Correct for containment

- ◆ Issues:

- ◆ Short-fiber towers may need to be illuminated at an angle

- ◆ Containment issue

# Measurement program

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- ◆ Energy scan with electron ( at least 3 points)
  - ◆ Resolution and linearity
- ◆ Energy scan with pions
  - ◆ Resolution and linearity (containment issue)
  - ◆ Effect of displacement fibers
- ◆ Measurement with Interaction Target
  - ◆ e/had separation in multiparticle event
  
- ◆ ADC/DRS measurement will allow to compare PID with long/short arrangement method to previously used method (time info)