New R&D results:

Investigation of light yield from two different size of scintillators produced by ITeP

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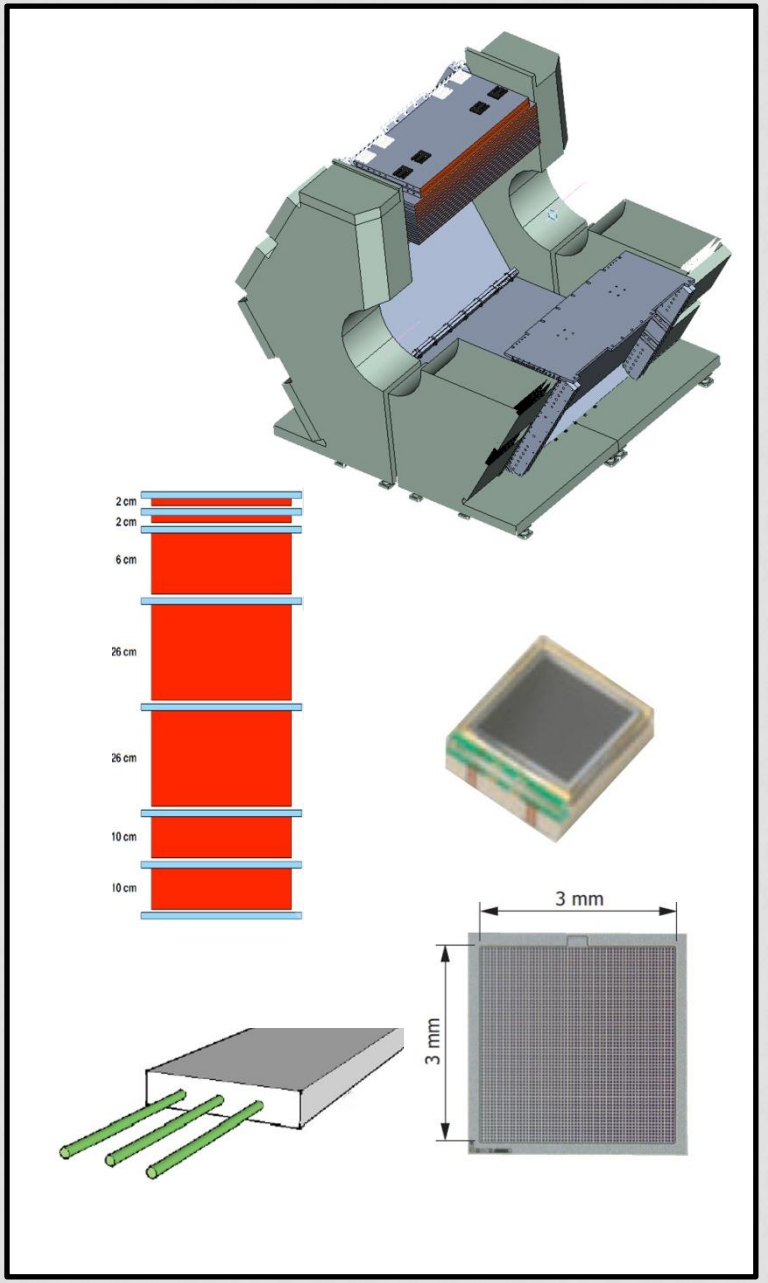
Motivation of the R&D studies continuation

Under discusion:

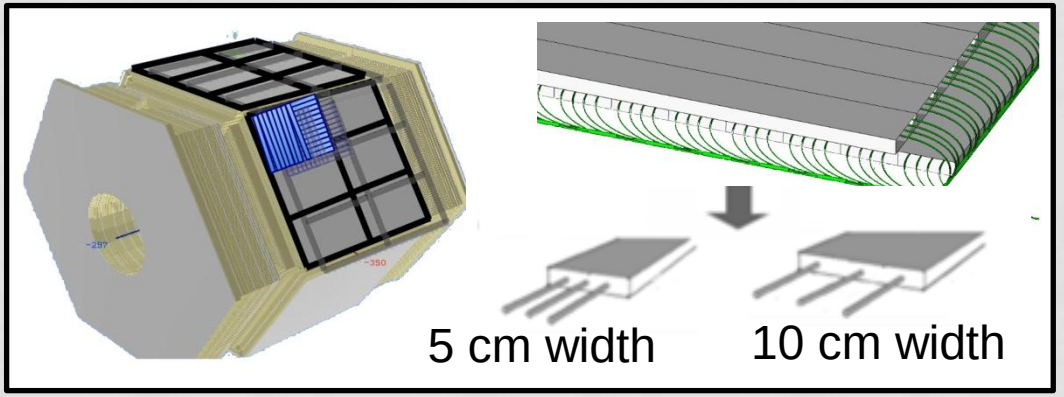
- Optimal number of fibers per strip
- Type of scintilators
- Couplings
- Thresolds



R&D RESULTS FROM FERRARA

For achieve the best possible efficiency of the light detection and simplicity of the specific measuring system.

The IFR detector's both barrel and endcaps structures will be read out in *binary mode*:



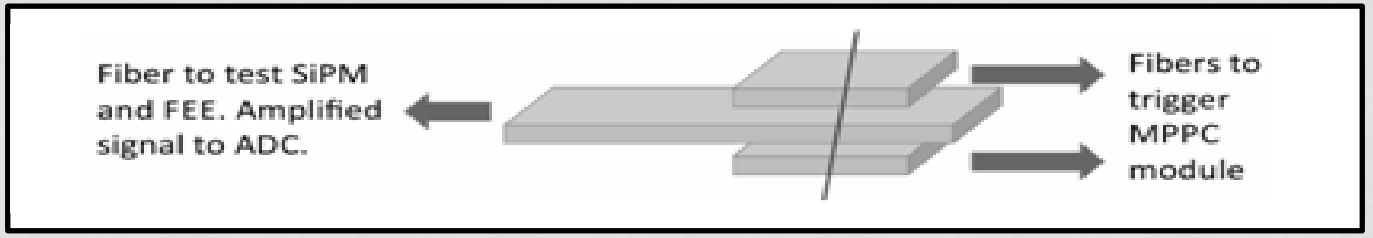
- two different dimensions of scintillator bars will be used:
- 5 & 10 cm width for the Barrel;
- 5 cm width in the endcaps.

Results from May and June 2012 obtained in Ferrara:

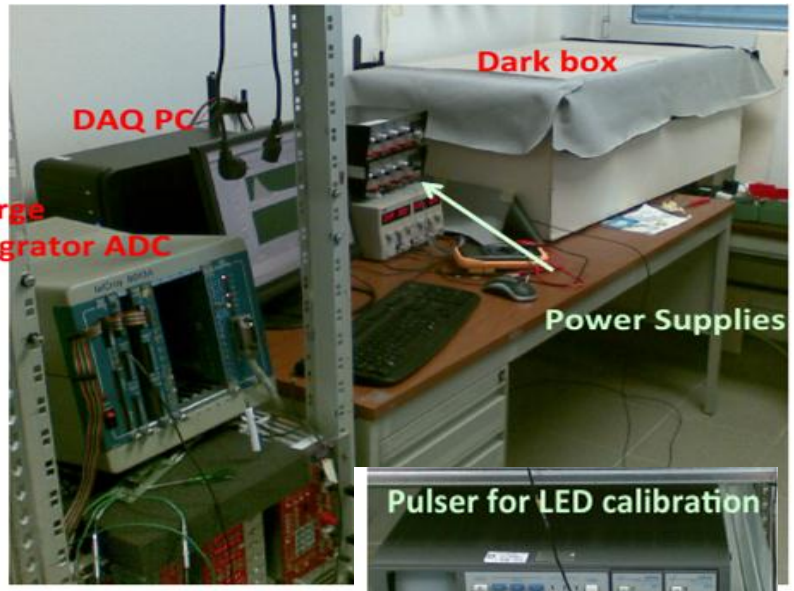
Investigation of light yield from two different size of scintillators produced by ITEP

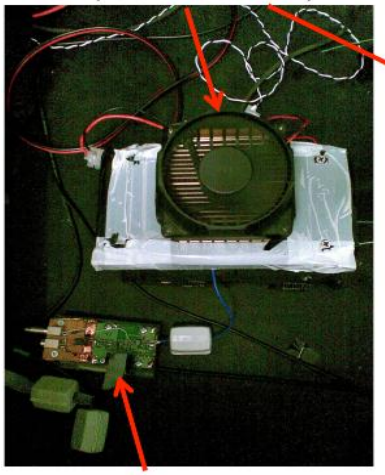
R&D RESULTS FROM FERRARA

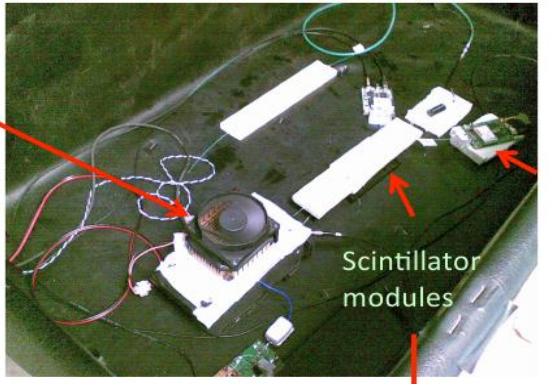
- Performed by using mainly cosmic rays;

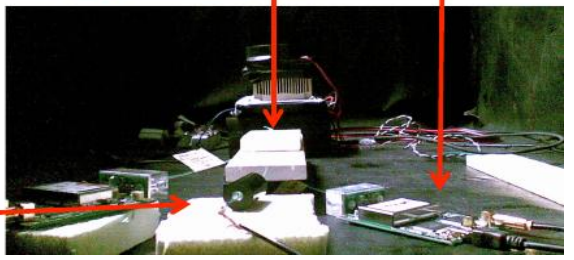


- The setup placed inside a custom built dark box to keep scintillators, fibers and photodetectors in a light-tight volume.





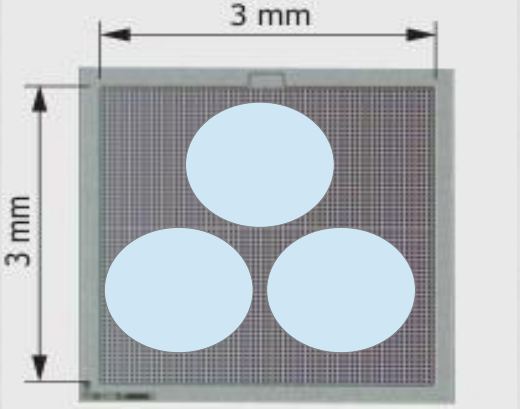




R&D STUDIES IN FERRARA

Experimental setup:

- **scintilators**: **ITEP** (width 10 & 5 cm, length 25 cm),
- **WLS fibers**: Φ = 1.2 mm, length = 53 cm,
- **MPPC Hamamatsu, 3x3 mm, 50 µm pitch**
- Mechanic coupling: 1, 2 or 3 WLS fibers plugged in to the active area



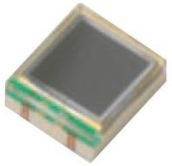
The setup has allowed to:

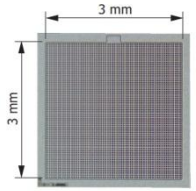
- perform SiPM characterization,
- studies of a light collection depending on number of fibers plugged in to the photodetector.

CALIBRATION

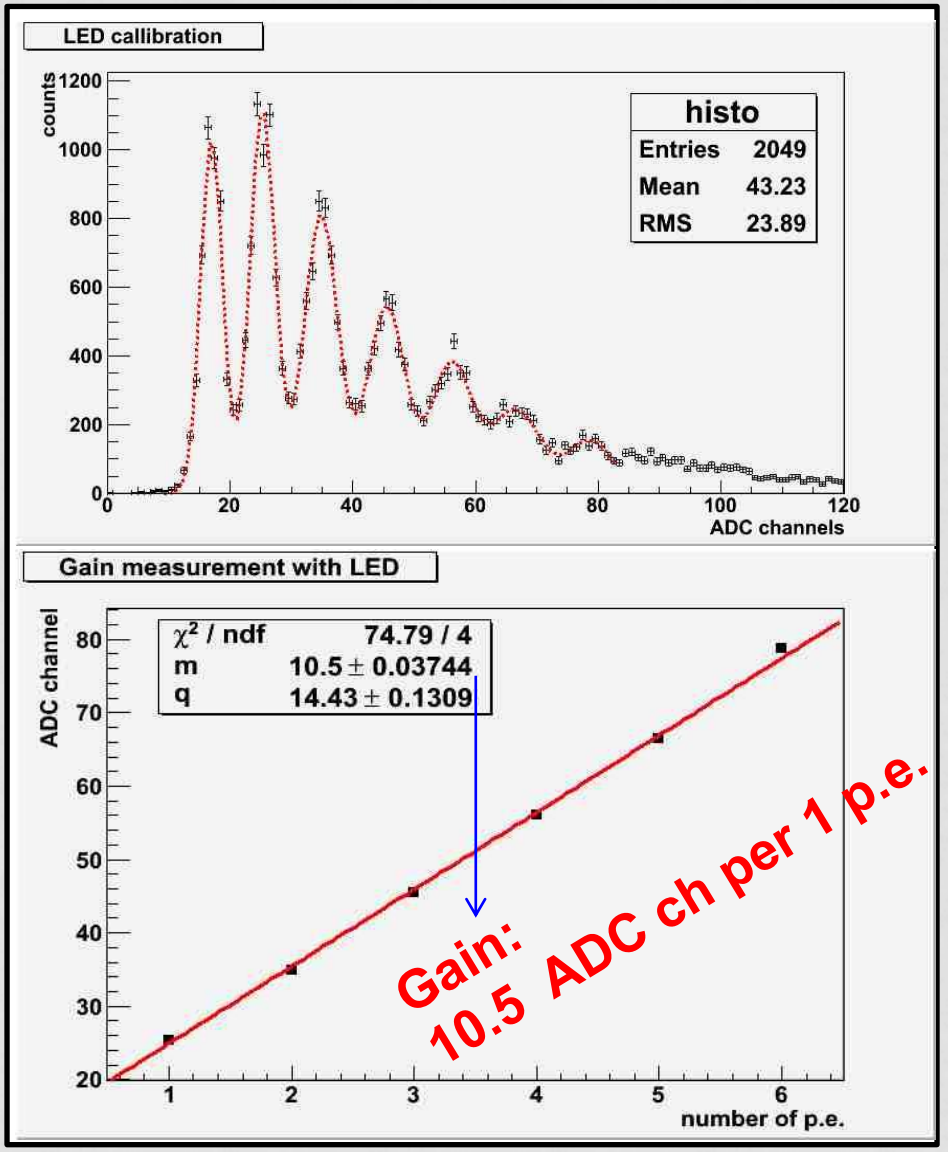
SiPM:
MPPC 3x3 mm^2

T = 21.5 C
Vbias = 72.5 V

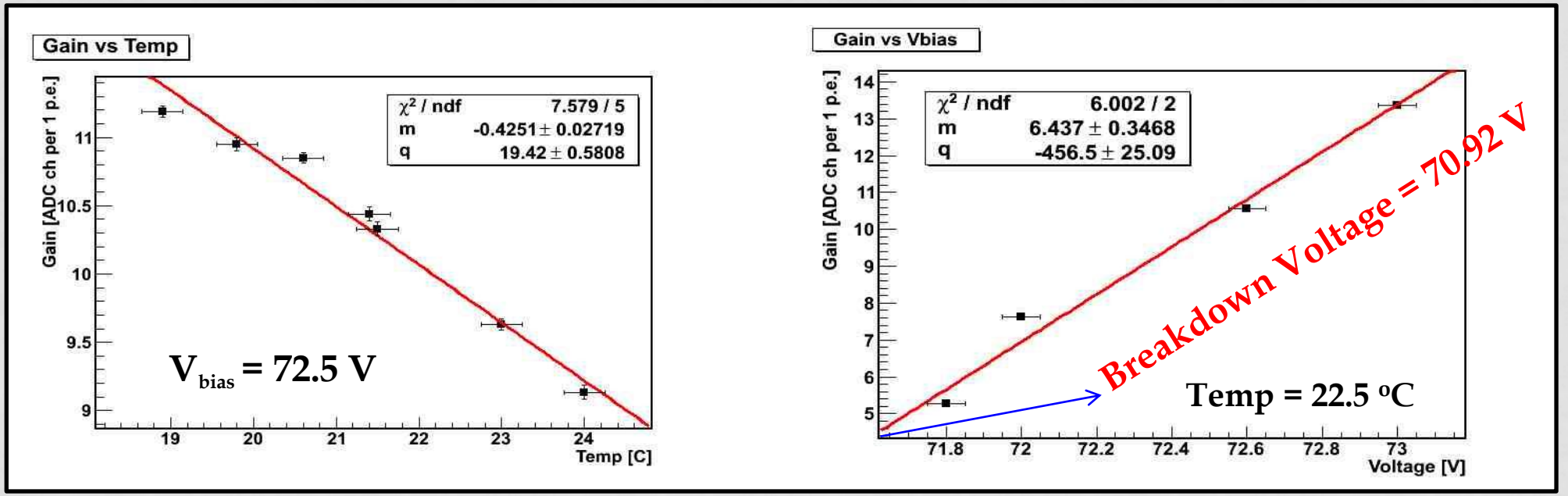




- Calibration of the gain may be obtained by using the position of the single photon peak in the spectra (corresponding to the amount of charge)



CALIBRATION

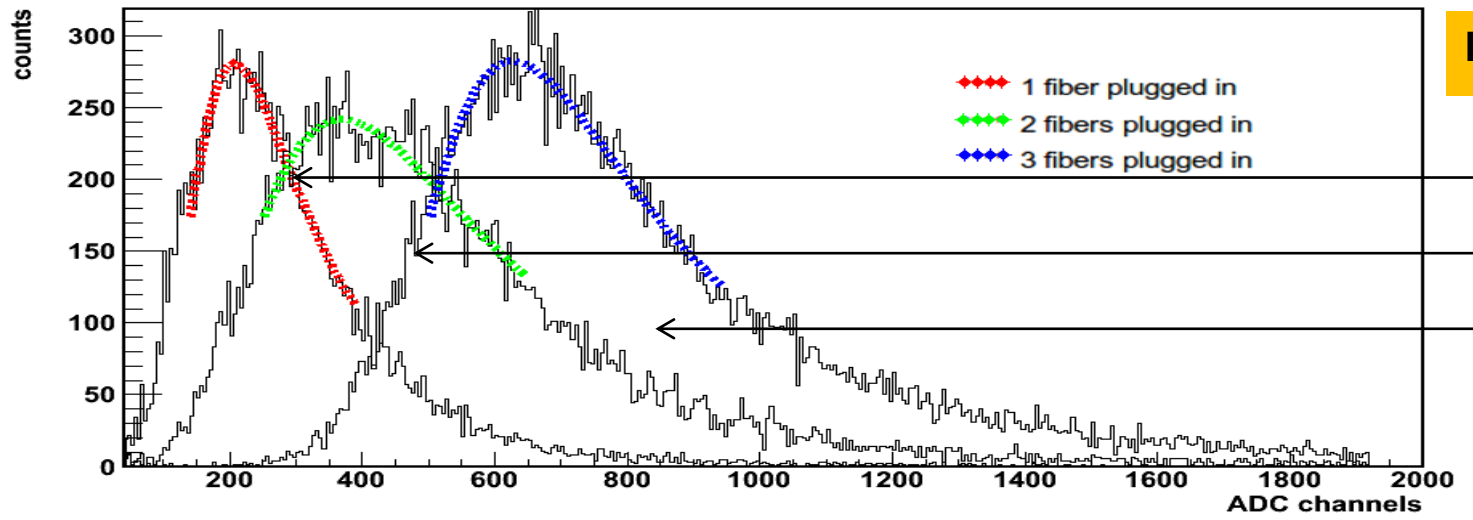


▫ It possible to estimate gain under different conditions, i.e.:

with conditions
Vbias = 72.5 V Temp = 21.5 °C
Gain = 10.28 ADC ch per 1 p.e.

▫ To compare different devices it is neccessary to give results for the same voltage over breakdown voltage for each devices

Light yield from two different size of scintillators – signal from cosmic

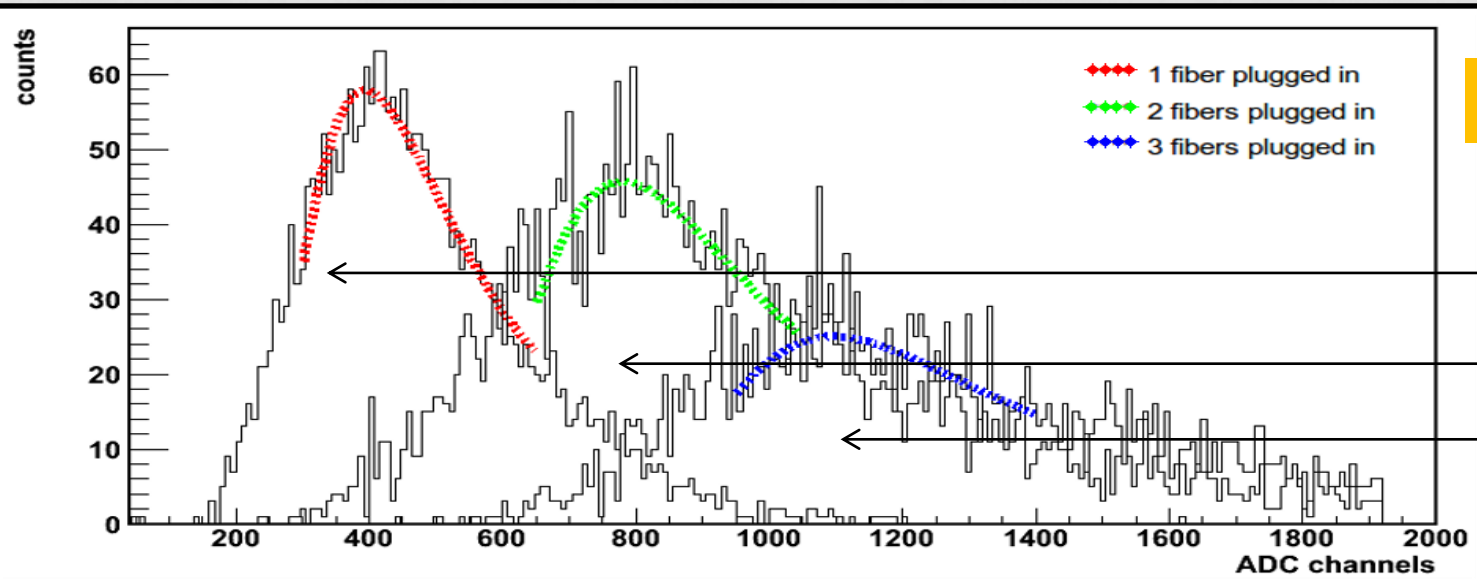


ITEP - width 10 cm

19 p.e.

37 p.e.

63 p.e.



ITEP - width 5 cm

37.4 p.e.

74.6 p.e.

105.5 p.e.