# Status Report on Scintillator/SiPM counters for the FES Lumi Trigger System

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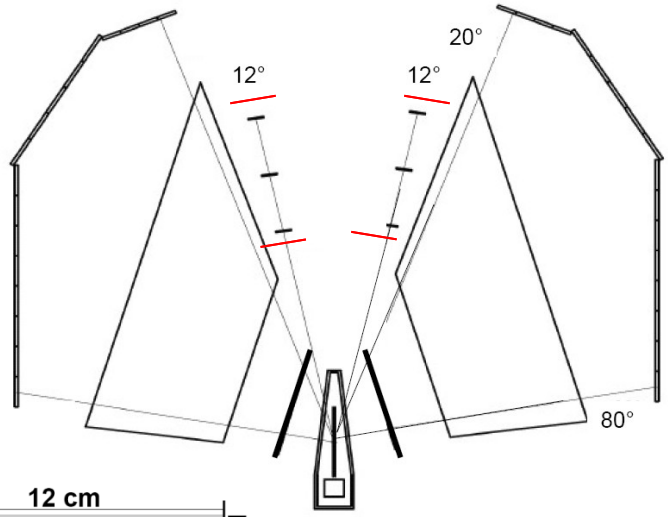
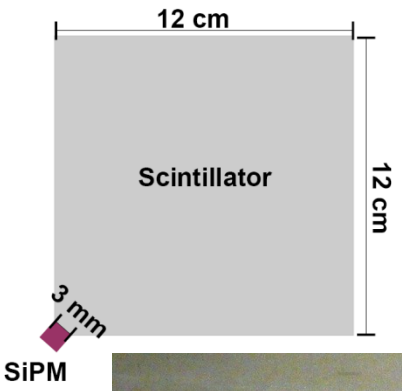
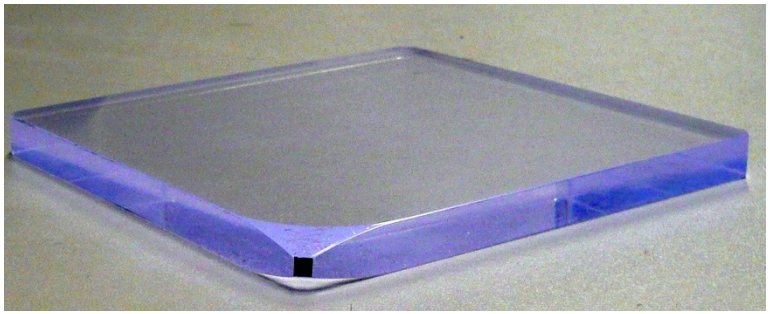
# The FES LUMI trigger system

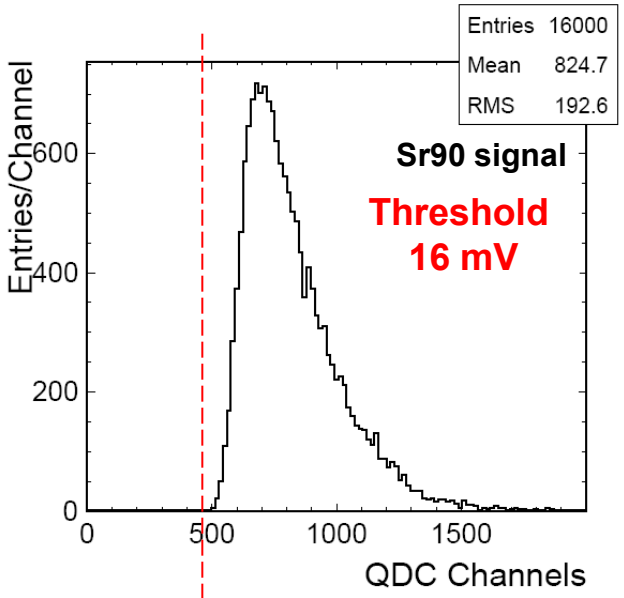


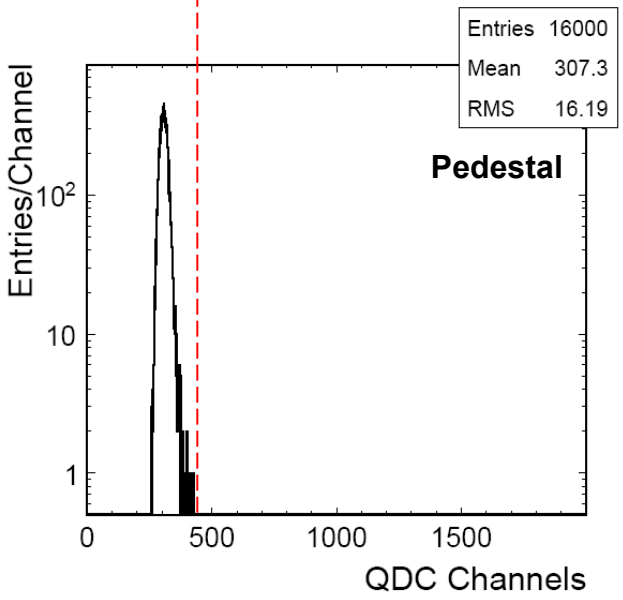



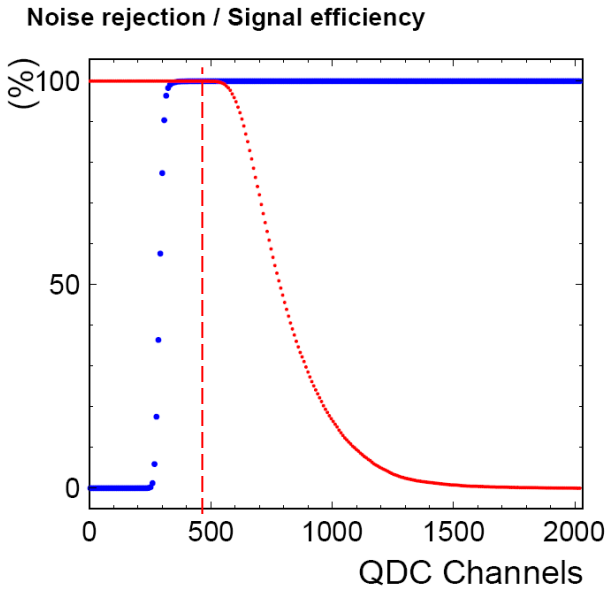



- All detectors, front end electronics are NEW,
- 2 x 2 Scintillator/SiPM detection system installed on the detector.
- **Scintillators:**
  - 12x12x0.8 $cm^3$
  - Curvilinear shape of the SiPM read out window for better scintillation light collection.
- **SiPMs:**
  - Hamamatsu 3x3 $mm^2$ , 1600 pixels
  - Better sensitivity to blue scintillation light (P.D.E. 40% at 400 nm)

# Counters efficiency Lab Test



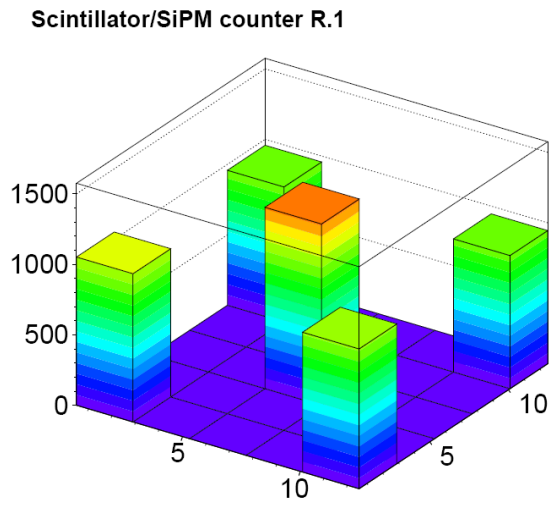



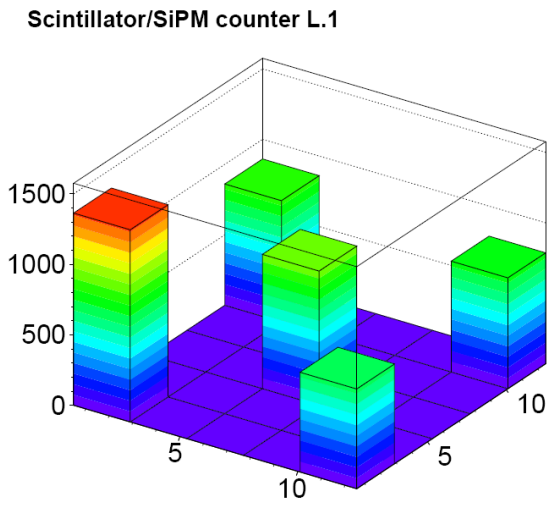



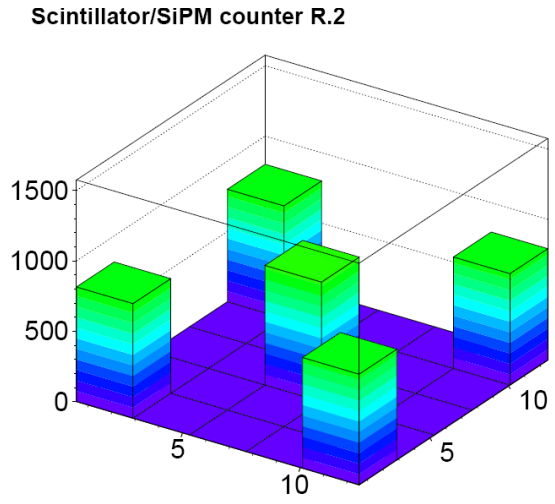

**Test with $^{90}$Sr (0.546 MeV, 2.28 MeV $\beta^-$ emitter)**

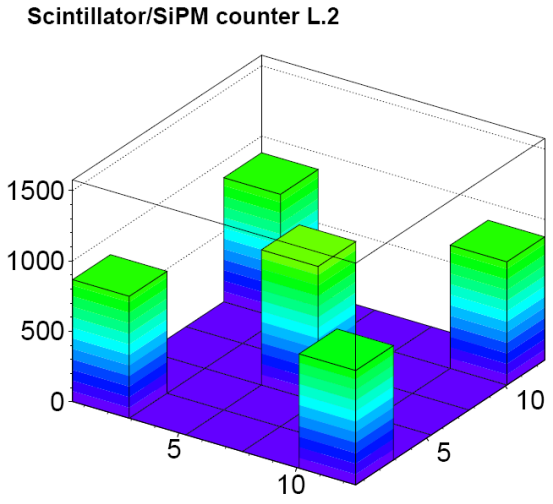
**Excellent signal separation (100%) at all impact positions in the scintillator**

# Counters efficiency Lab Test




Scintillator/SiPM counters in test setup

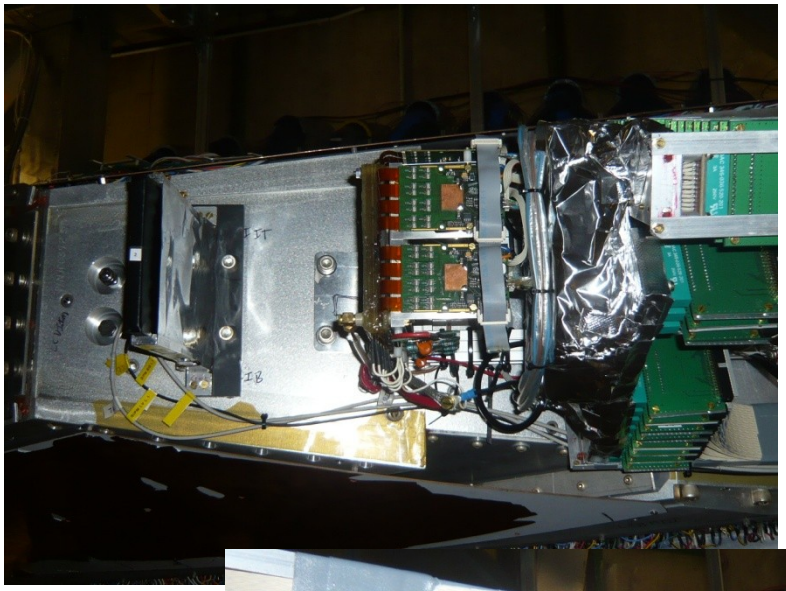
$^{90}$Sr source placed on five different point on the scintillator.

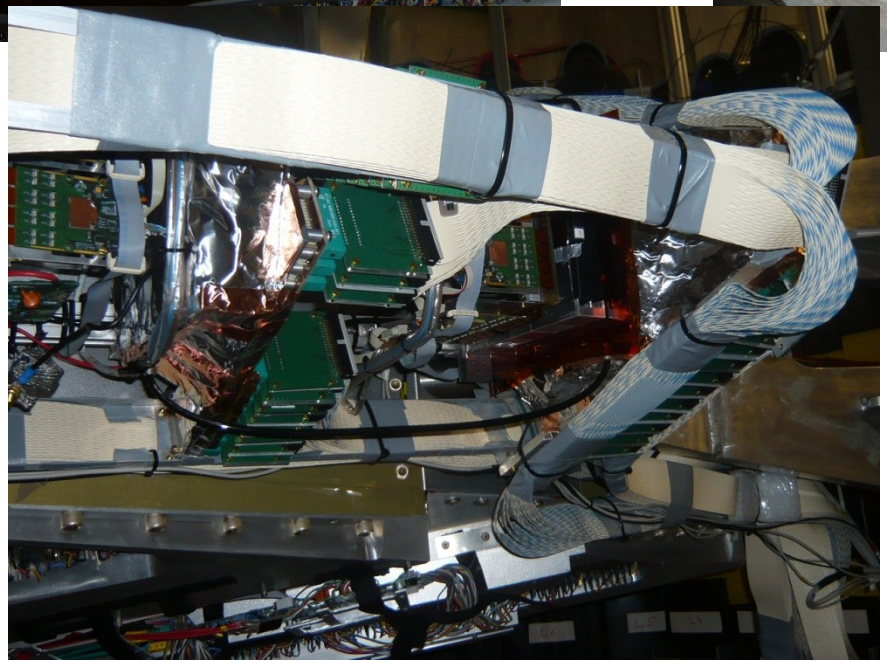
**On the plot:**
**MPV of the energy distribution**

**Noise level**

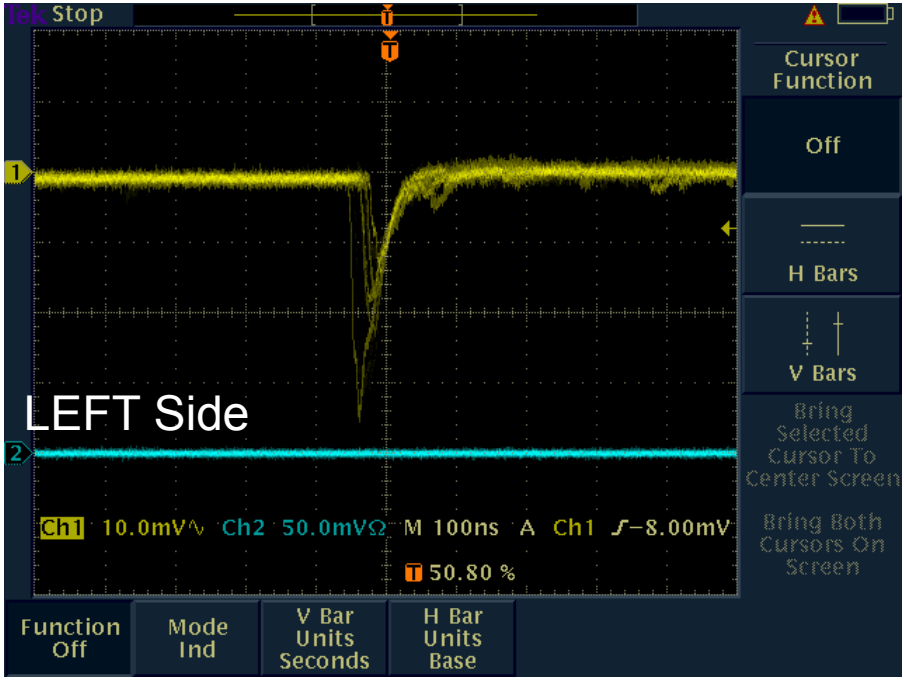
**100 % signal detection efficiency level.**

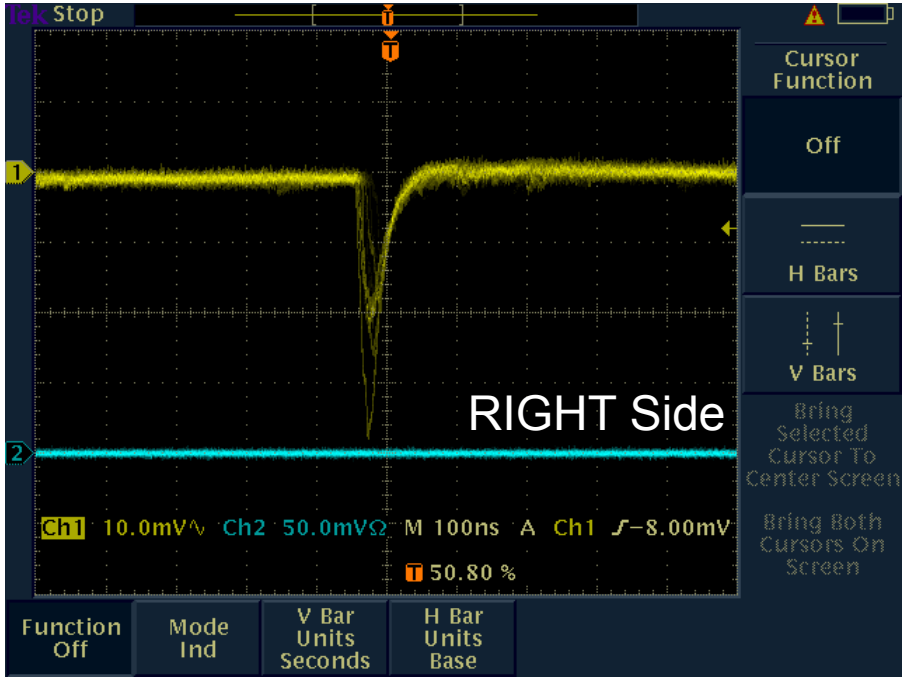
# Installation at Exp Hall





# Counters performance at Exp Hall




Scintillator/SiPM counters installed on the OLYMPUS experimental setup.

Signal from $^{90}Sr$ $\beta^-$ source.
Preamplification (10).

**Noise:** **< 5 mV**
**Signal:** **30 mV**

The main goal is to suppress the pickup Noise

# Trigger Efficiency and Redundancy

- First goal for Run is to get good performance (Trigger Efficiency) of the Scintillator/SiPM detectors (one SiPM per Scintillator),
- Estimation of the Trigger Efficiency, using the MWPC,
- For the future we will consider (redundancy):
  - Monitoring of analog signals from SiPM,
  - Possibility of istallation addition scintillator/SiPM detectors, position at second stations,
  - Possibility of preparation the new scintillator/SiPM detector, equipped by 2 SiPM.

# Conclusions

- FES luminosity trigger system based on scintillator/SiPM technology installed,
- Excellent efficiency signal detection (100%) at low discriminator threshold,
- The test in the Experimental Hall Coinditions is good,
- Pickup Noise Suppression (if will be necessary),
- Plans of the Trigger Efficiency determination and monitoring.