

# The detector signal chain of the P2 experiment at MESA

*(design & beam tests including radiation hardness)*



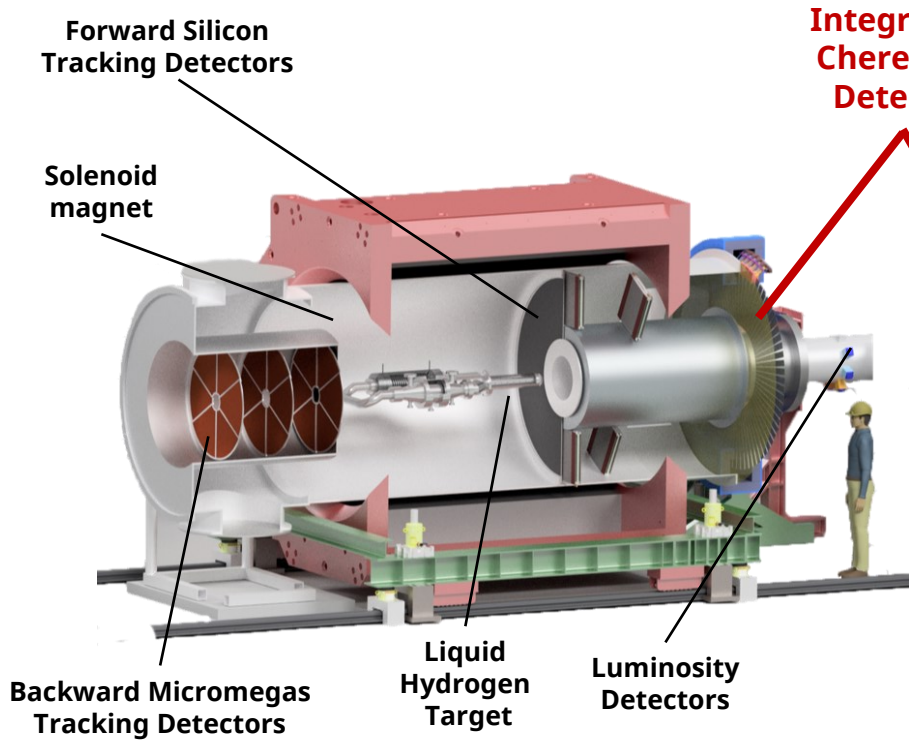
**Rahima Krini | P2 Experiment**



**Project: B 01**

**A precision determination of the weak  
mixing angle  $\sin^2 \theta_w$  at low energies**

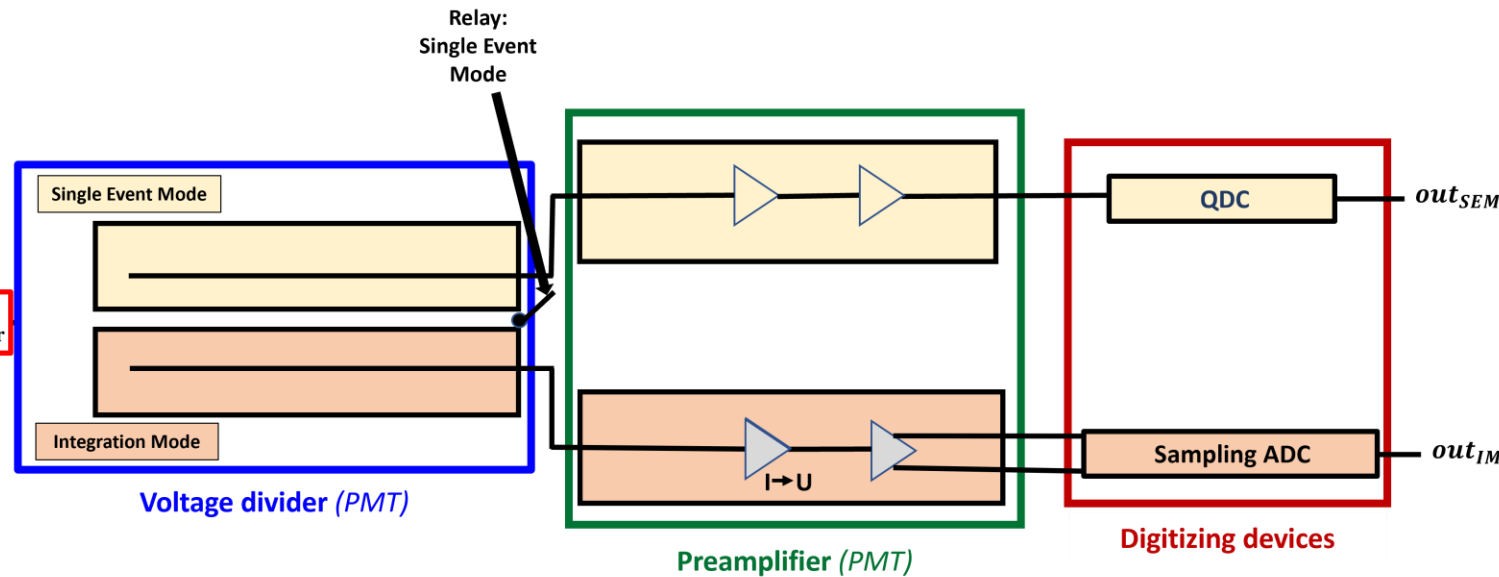
# P2 Experiment and link to Phd Project



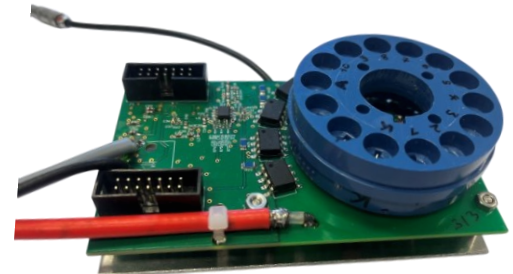
The P2 setup

**Integrating Cherenkov Detector**

SiO<sub>2</sub> - detector



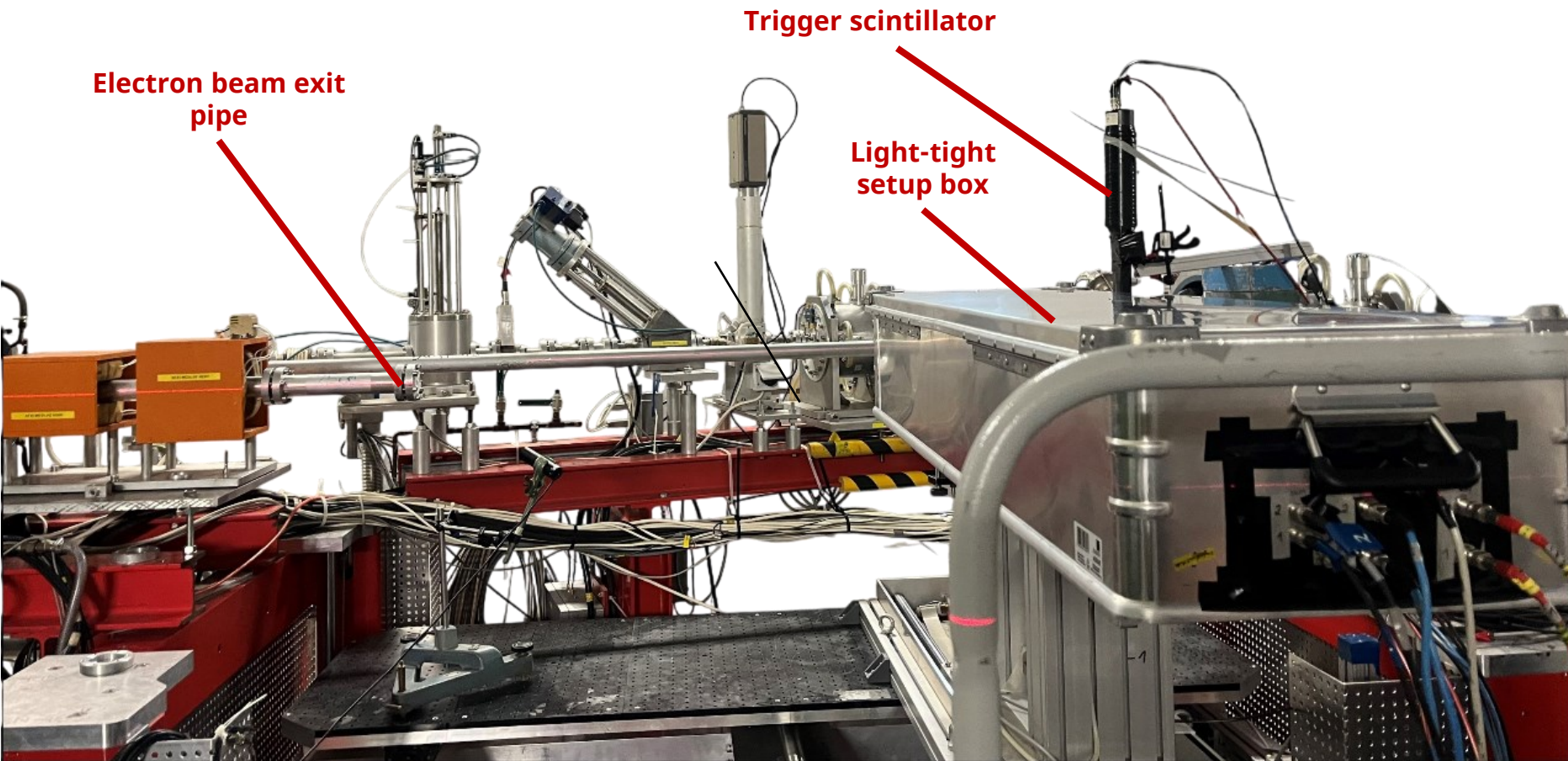
Schematic of the readout signal path for the Fused Silica Cherenkov Detector



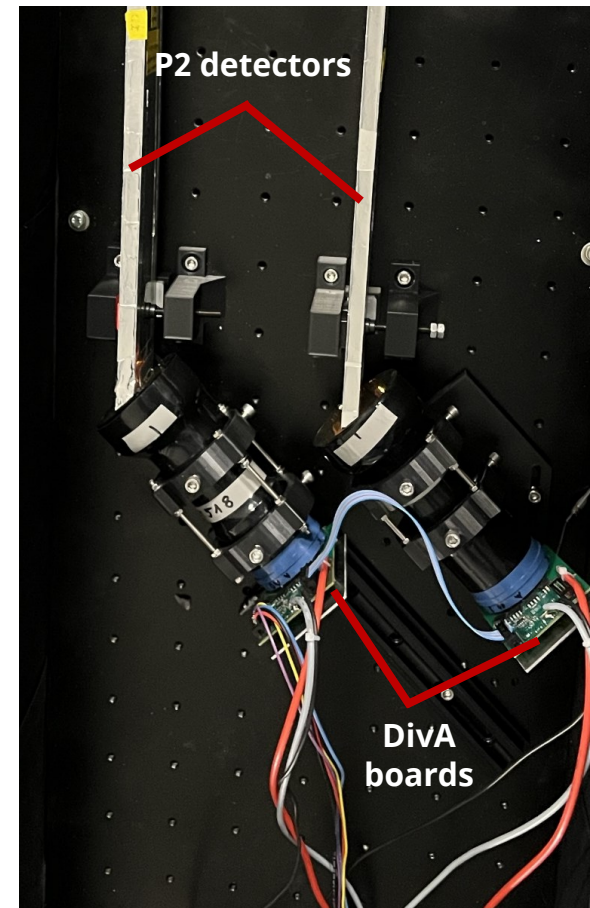
Voltage DIVider and preAmplifier, DivA board

Tests have been done in Single Event Mode and Integration Mode at electron rates expected at P2

# Experimental setup for Testing the Readout Electronics Chain

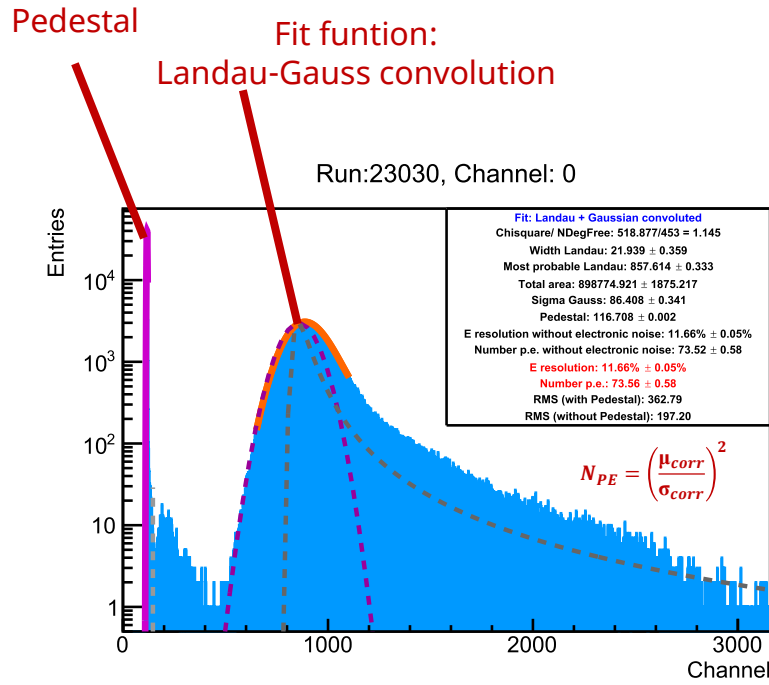


*Beam time setup at MAMI*



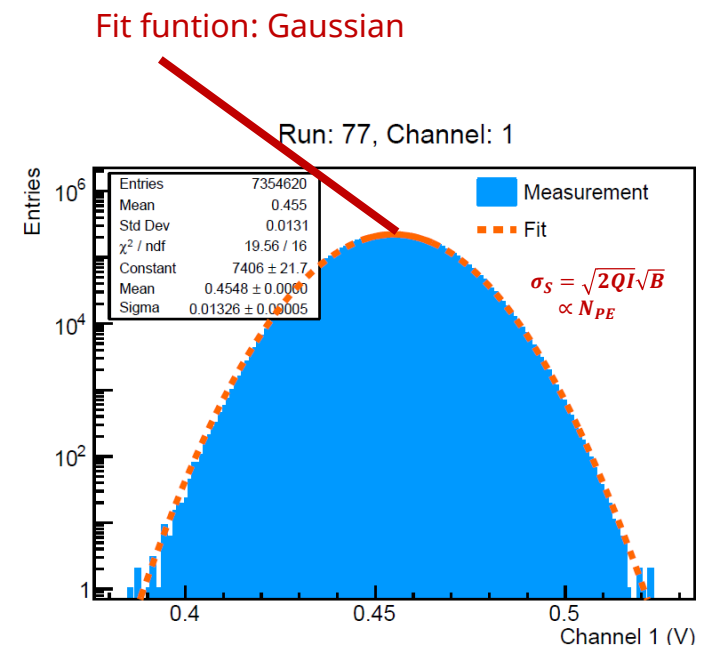
*Inside of the setup box*

# Evaluation of Electronics Performance via NPE determination



Nominal PMT voltage @ 790 V;  
Electron beam rate @ 4 kHz

QDC spectrum in SEM



Nominal PMT voltage @ 500 V;  
Electron beam current @ 1 GHz

ADC spectrum in IM

## Radiation Hardness Test

- DivA board (6300 Gy)
- Various voltage regulators (160 kGy)

... Do the measured NPE match expectations?

... Does the Diva board meet the requirements for P2?