Mu2e calorimeter readout system

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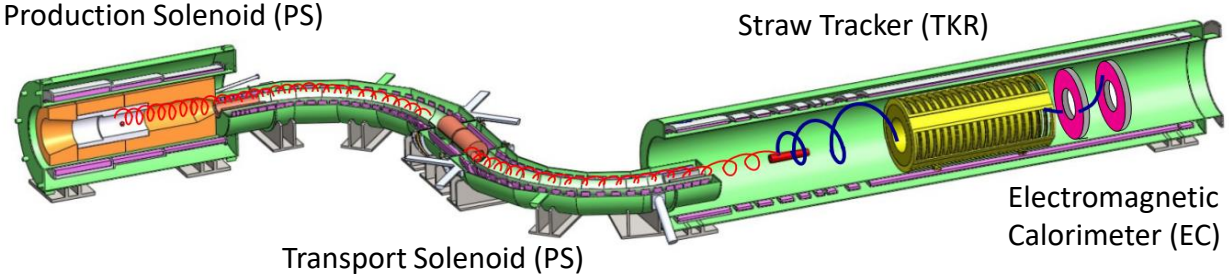
Production Solenoid (PS)

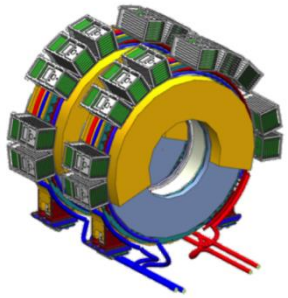
Straw Tracker (TKR)



Electromagnetic Calorimeter (EC)

Transport Solenoid (PS)

Look for the 105 MeV conversion electron

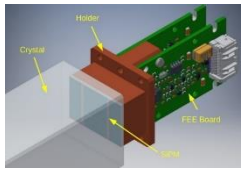


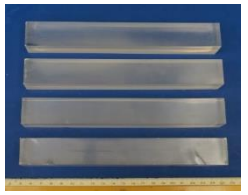
Calorimeter Requirements:

- Particle identification μ/e
- Seed for track pattern recognition
- Independent trigger

→ **$\Delta E/E < 10\%$ and $\Delta t < 500$ ps**

→ **Position resolution of O(1 cm)**



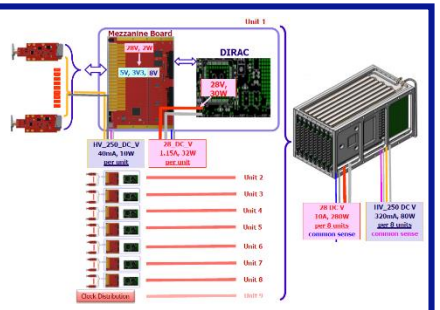


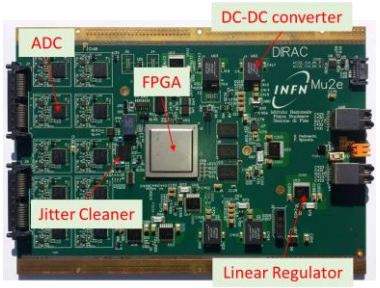
Digitizer Requirements:

- Very intense particle flux → high sampling rate digitizers to resolve pile-up → sampling frequency of **200 Msamples** with **12 bits** ADC
- System located inside the cryostat → harsh environment
- Limited space
- Limited acces

Front-end boards connected to SiPM provide:

- Amplification
- Local linear regulation of the bias voltage
- Monitoring of current and temperature
- Test pulse





- Working environment & sample rate imply limitations on the component choice
- Qualification for radiation tolerance
- DCDC converter must also be tested in magnetic field.
- Compatibility between FPGA and ADC must be tested

- ADC and the DCDC converter tested with neutrons and gamma rays for radiation tolerance.
- ADC test results: no evidence of bit flips or waveforms shape variation emerged
- DCDC converter tested under a strong magnetic field at the INFN Lasa laboratory