LNF Beam Tests

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Rich Meeting, 13 July 2012

The SiPM Alternative

- **MA-PMTs are an almost plug and play device good to accomplish one sector before CLAS12 starts physics measurements**

Major issues

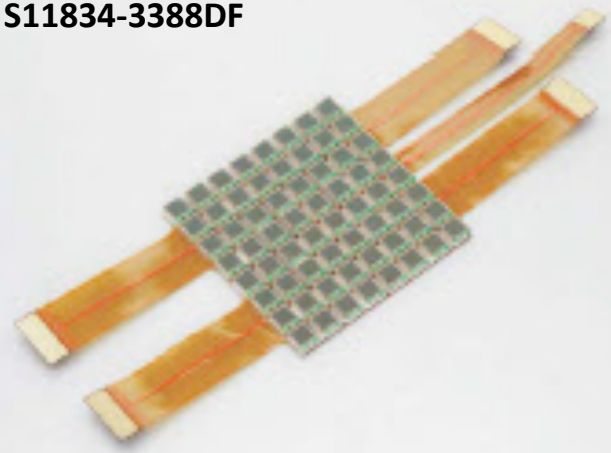
- **Their material budget, cost and magnetic field sensitivity limit the alternatives for better detector configurations**

SiPM:
Fast develop ongoing
- 10 → 1 MHz dark counts
- cost rapidely reducing

- **Cost:**
  - ✔ *Reduce active area*
  - ✔ *Operate with cheaper devices*

- **Average number of photoelectrons:**
  - ✔ *Increase quantum efficiency*
  - ✔ *Move QE peak toward green*
  - ✔ *Change configuration*

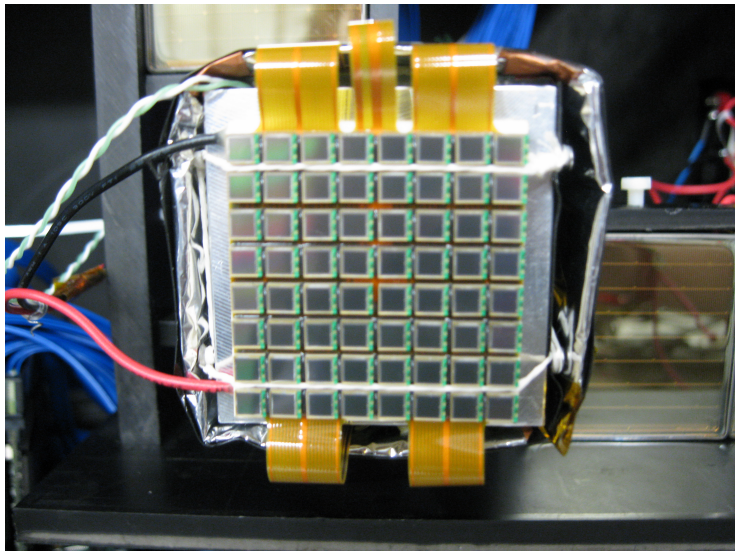
S11834-3388DF

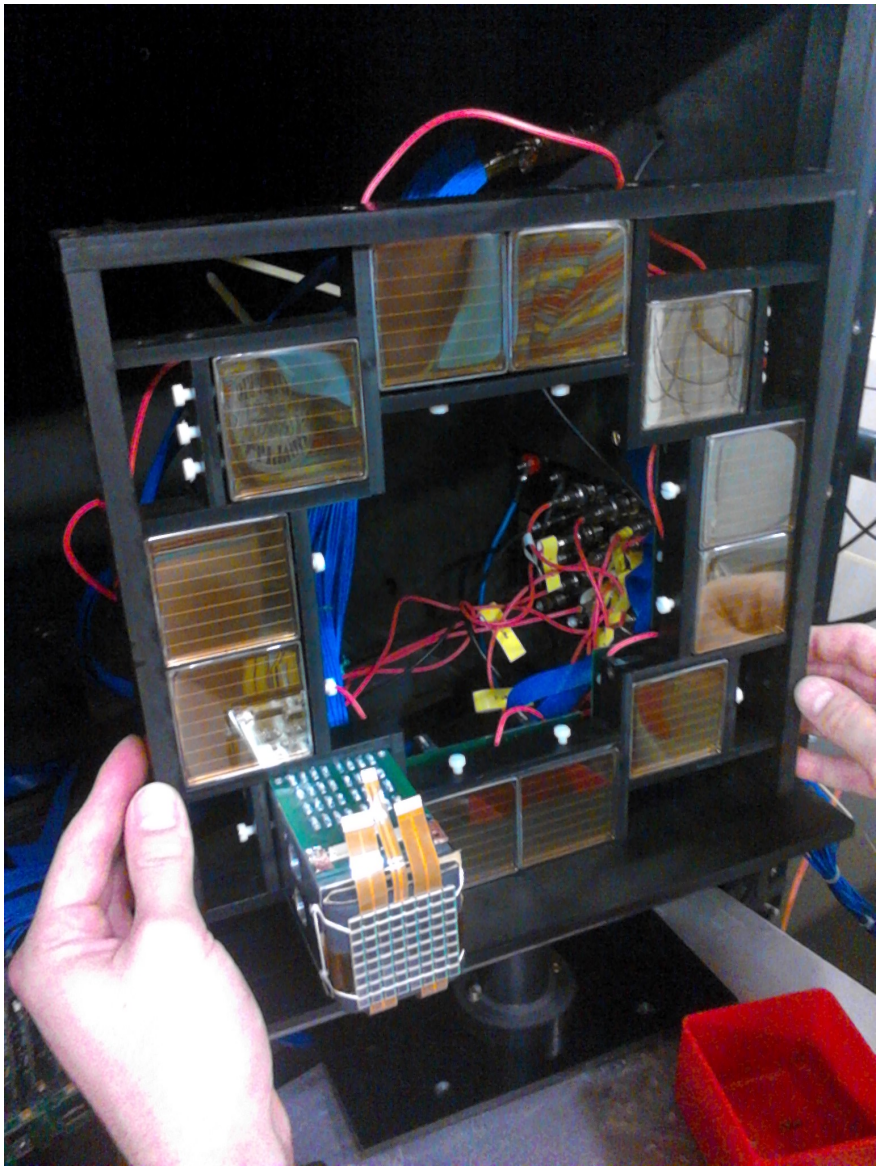


SiPM might offer a cheaper and more efficient solution expecially in a longer time perspective for the other sectors

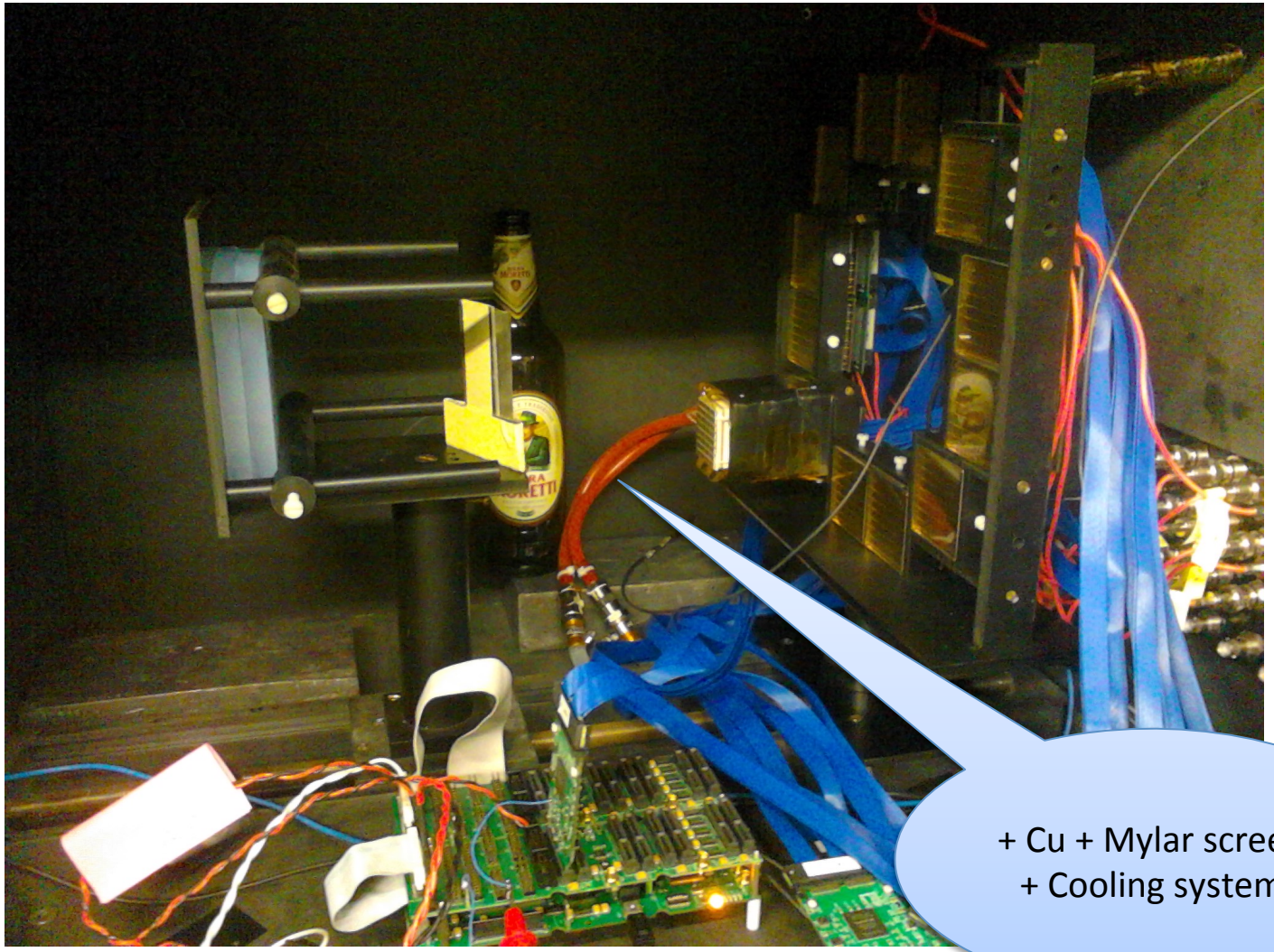
- **Important to test them before the TDR write-up**

The SiPM Matrix

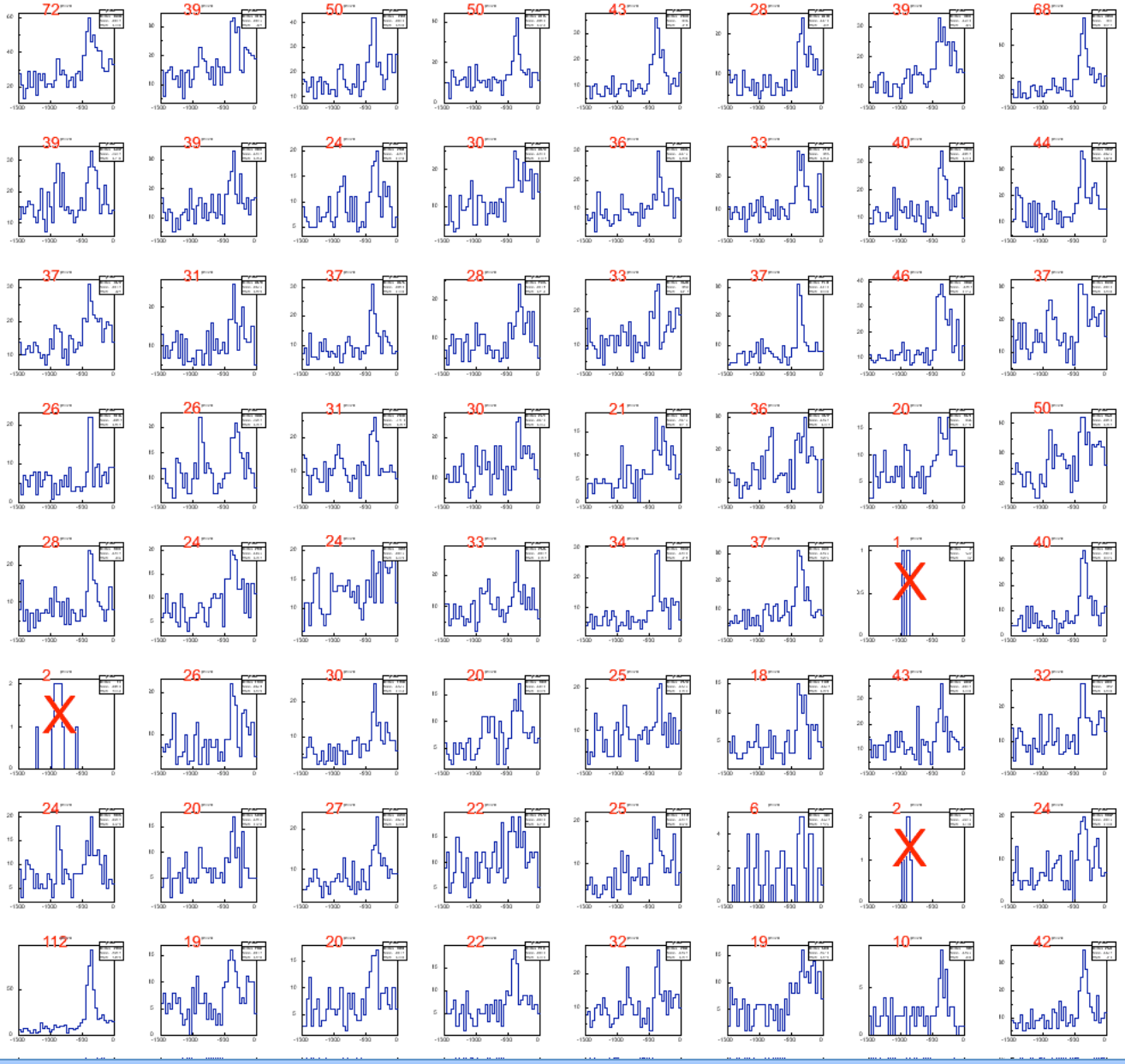




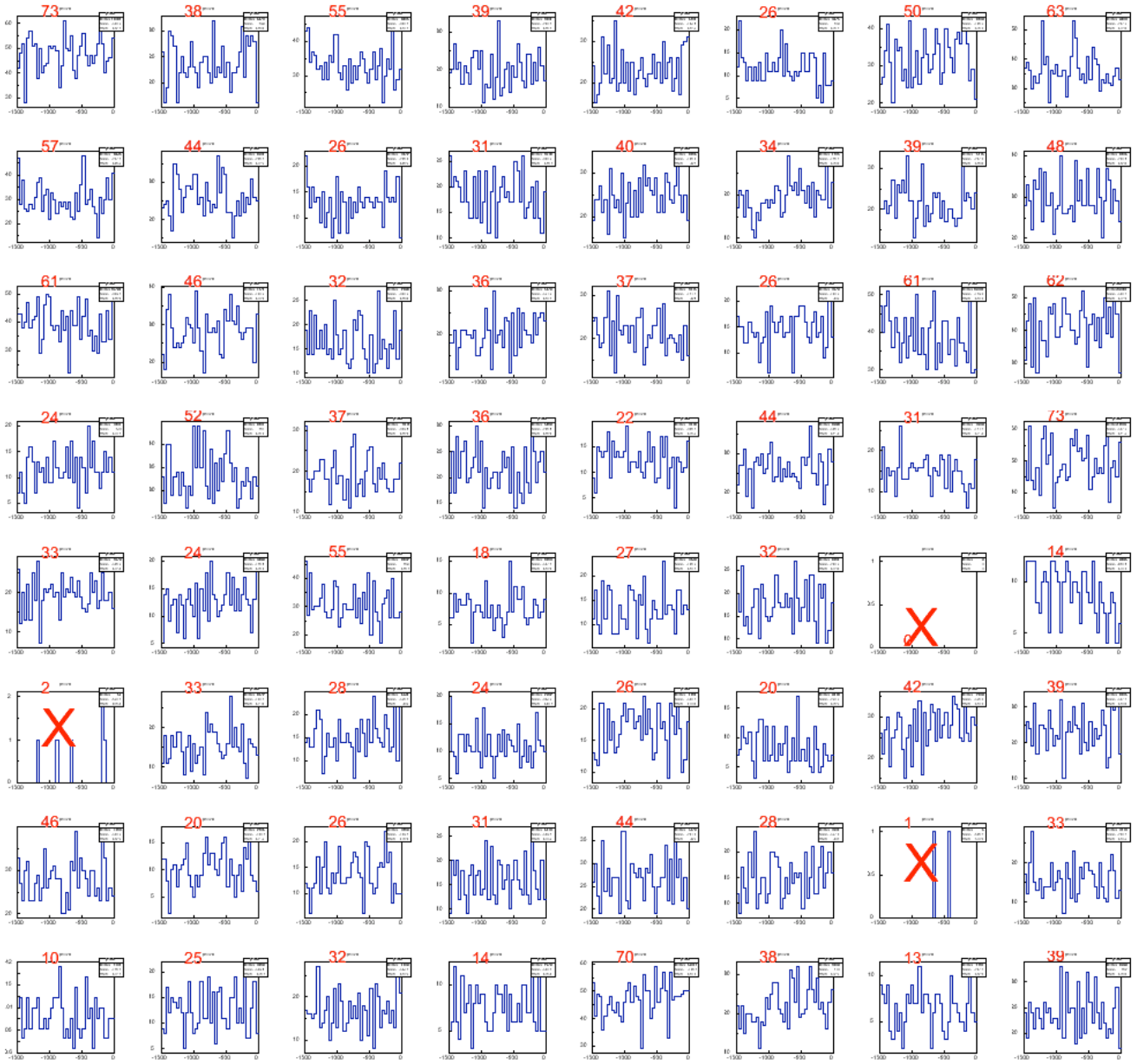
The SiPM Set-up



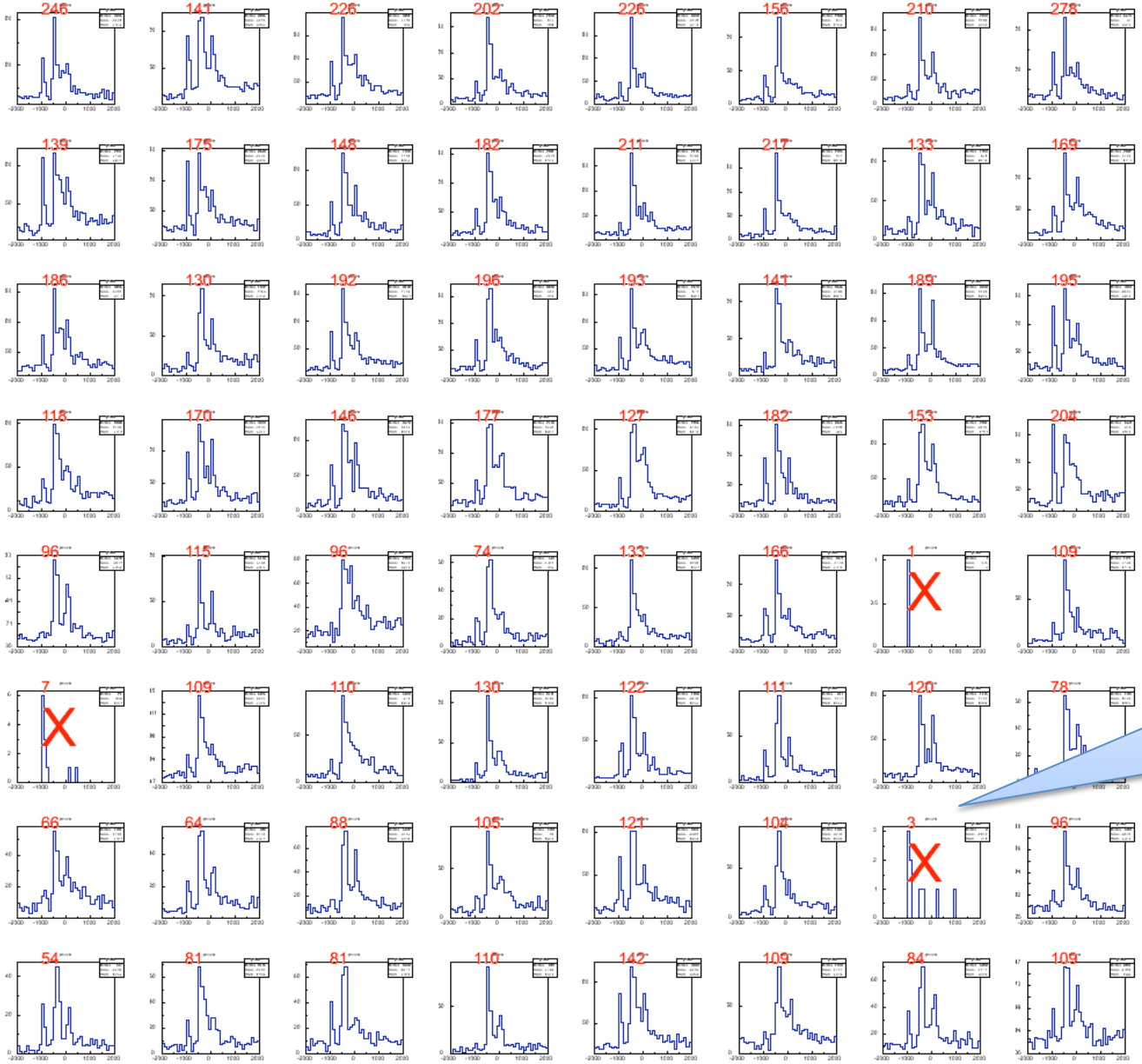
SiPM with Plexiglass



SiPM without Plexiglass

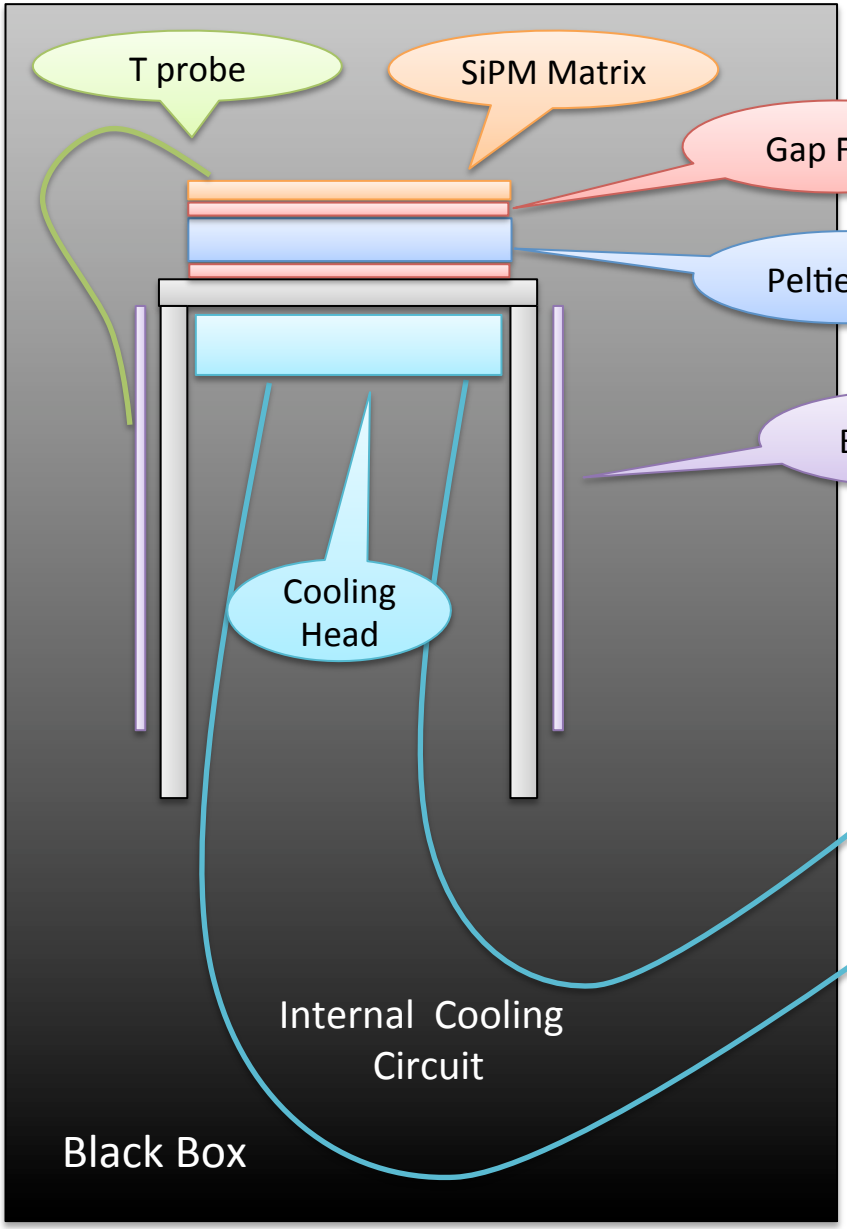


SiPM Sitting on the Beam



Peaks everywhere: wrong digital-to-digital converter in input to TDC

SiPM Cooling System



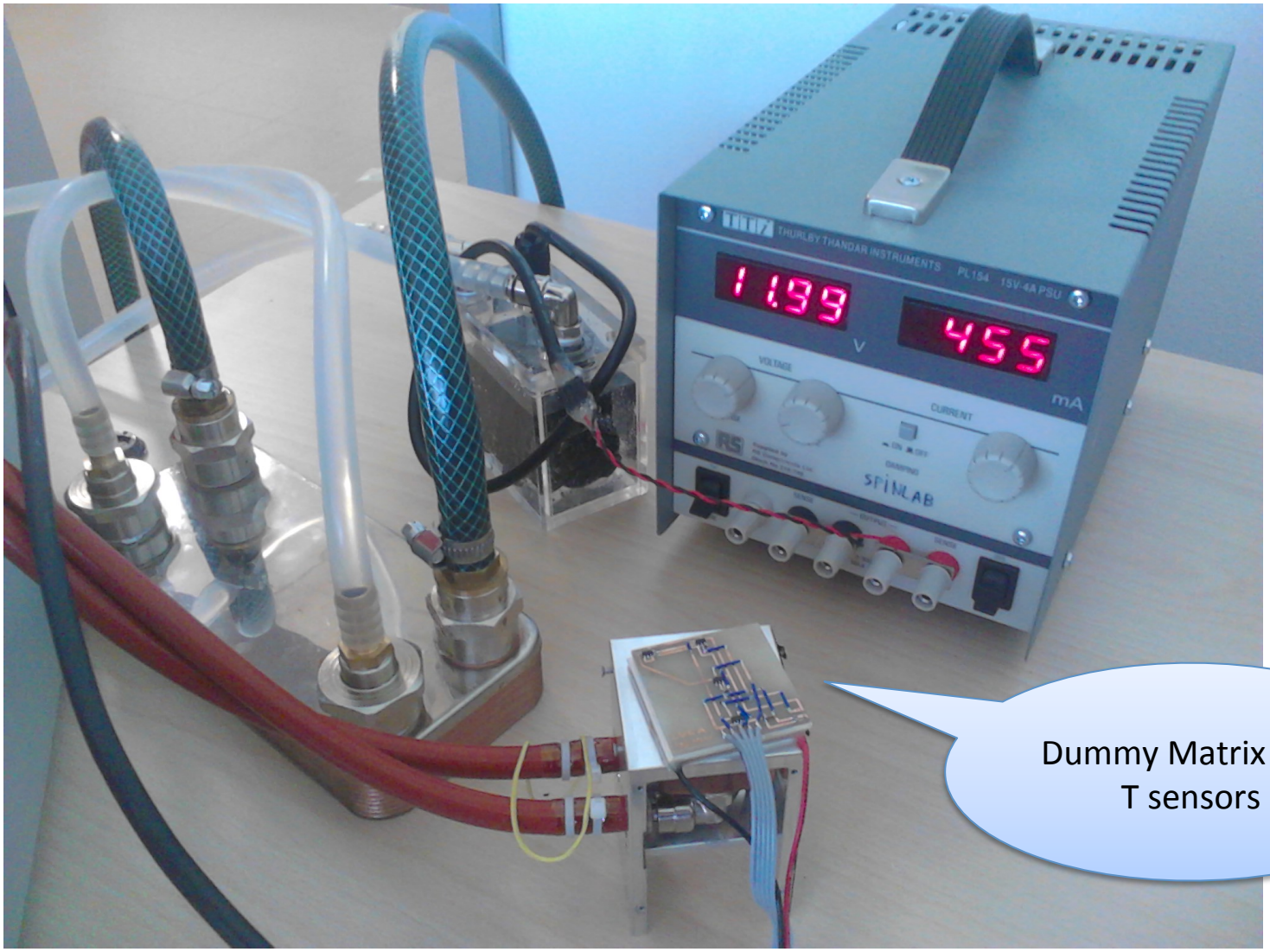
Goal: control SiPM temperature
cool SiPM to suppress dark counts

Chiller

Heat Exchanger

External Cooling Circuit

The Peltier Test



The Peltier Test