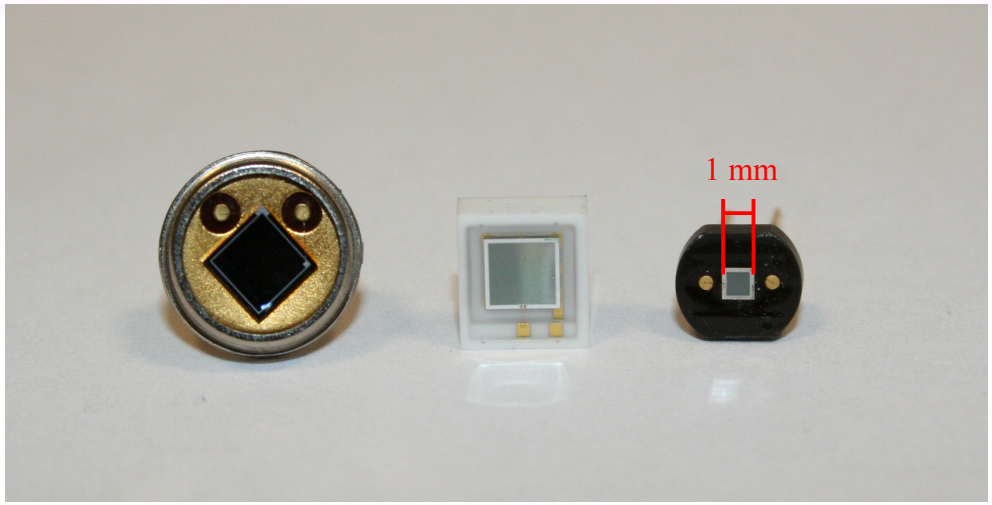
SiPM Small Talk

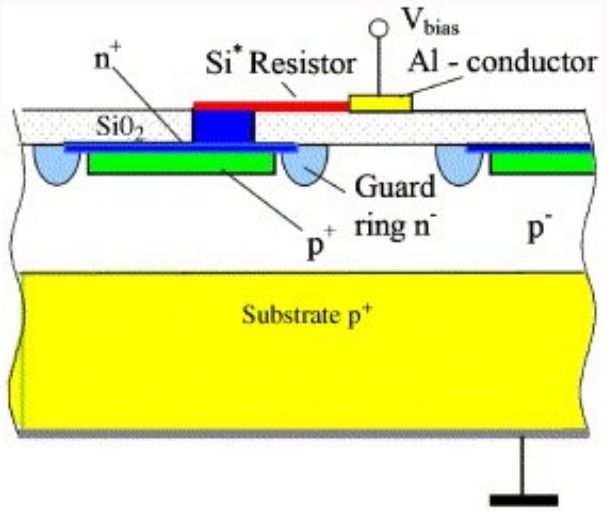
Lars-Halvard Thunold Helleve

- SiPM – Silicon Photo Multiplier
- Compact detectors
- Application: Hadronic Calorimeter



How they work

- Silicon based
- Geiger avalanche
- Pixelated grid
  - Number of hit pixels ~ number of photons



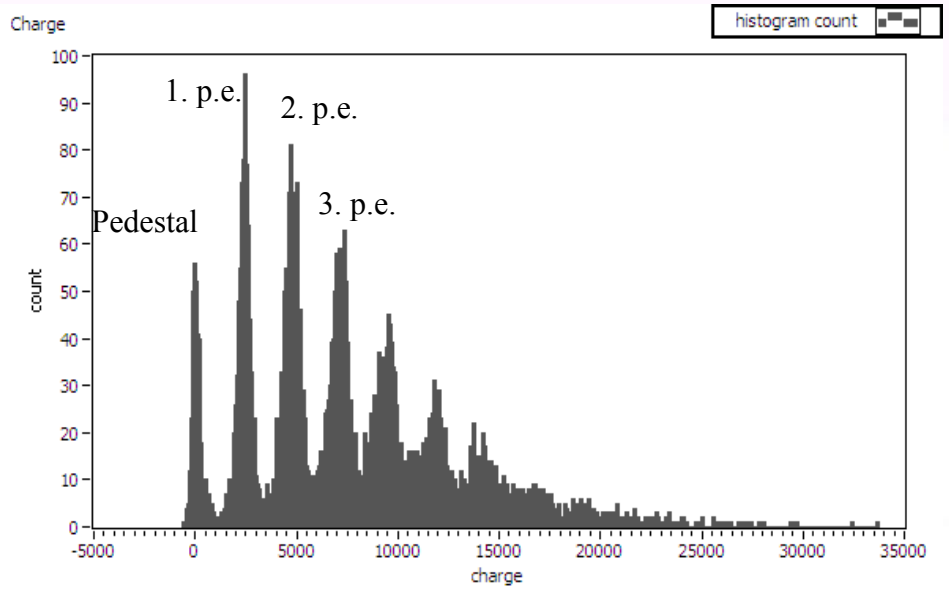
How they perform

Advantages

- Low bias Voltage
- Single photon sensitivity
- High gain
- Insensitive to nuclear count

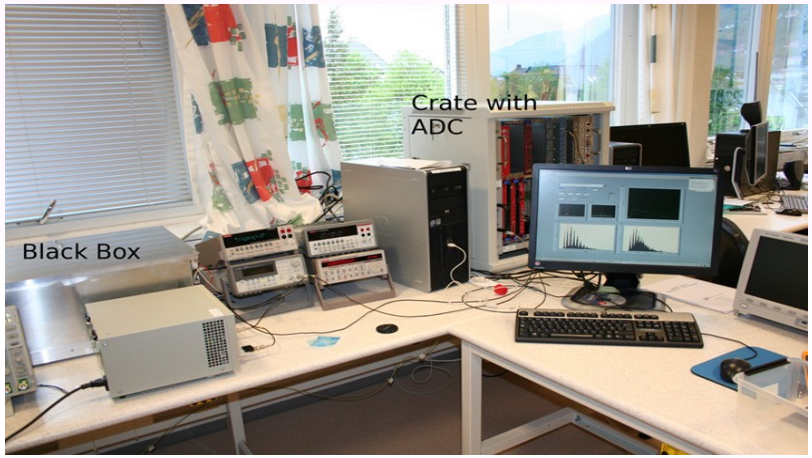
Disadvantages

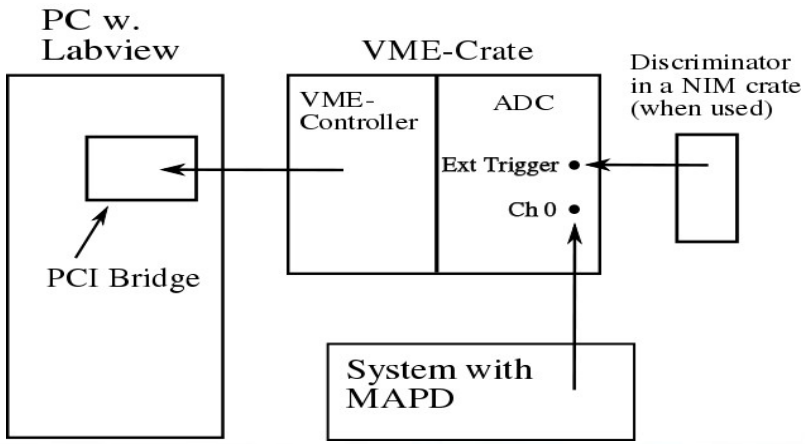
- High dark rate
- Temperature sensitive



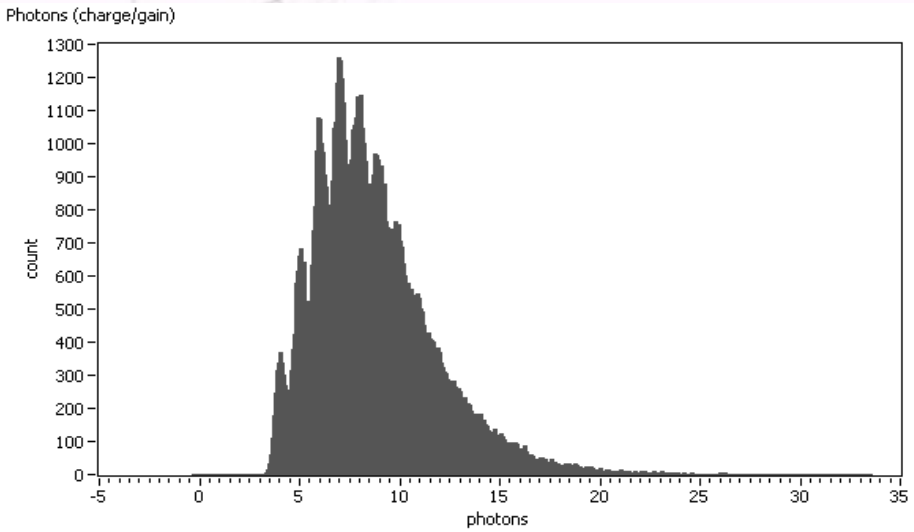
Set up

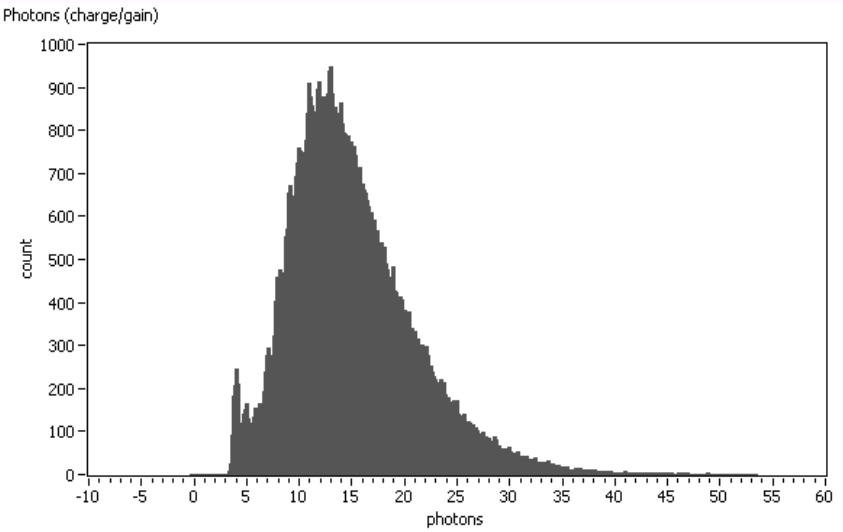
Scintillator
Reflector
WLS fiber
Electronics
Trigger





Measurements





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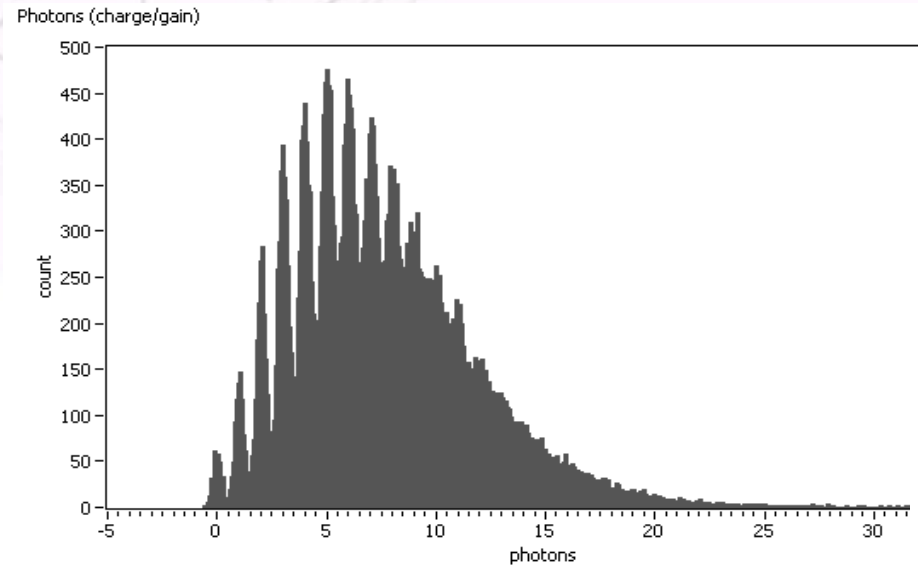

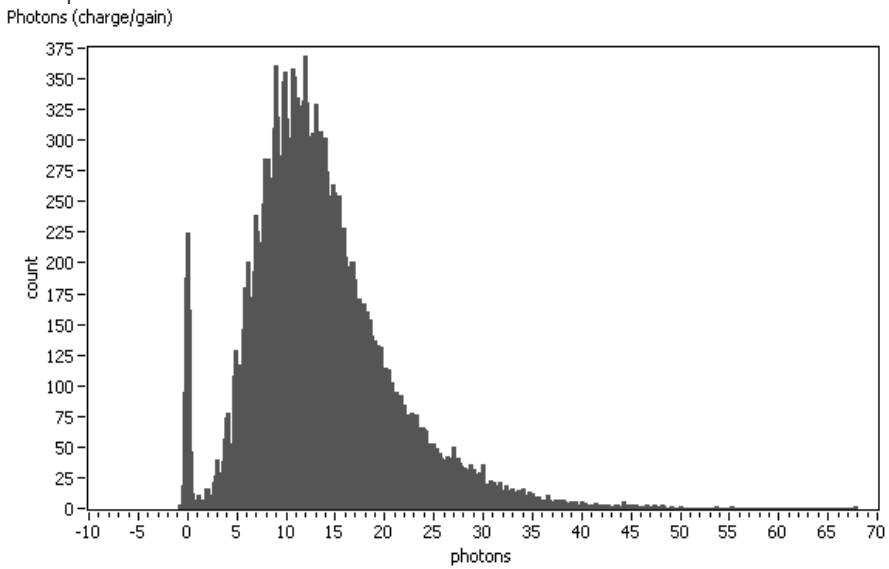

Outlook

- Future measurements
  - Reflector, WLS fiber, additional SiPM:s,...
  - Uniformity
  - Radiation hardness
- The Prototype
  - Crosstalk measurements

Summary

The SiPM is a possible scintillator readout detector for compact hadronic calorimetre in SuperB and SLHC applications

Early measurements have been successfully conducted

Additional measurements required...

References

- P. Buzhan et al. An advanced study of silicon photomultiplier. 2001. Talk Given at the International Conference on Advanced Technology and Particle Physics, Como, Italy.
- Hege Austrheim Erdal. Characterization of Multipixel Avalanche Photodiodes. Master Thesis in Nuclear Physics, University of Bergen Department of Physics and Technology June 2009