

First thoughts on quality assurance for tile mass production

Patrick Eckert
Kirchhoff Institut für Physik
Universität Heidelberg



KIRCHHOFF-
INSTITUT
FÜR PHYSIK



RUPRECHT-KARLS-
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HEIDELBERG

Outline

- Ideas on Large Scale Tile-testing
- First measurements

Motivation

How to test ≈ 8 million tiles for the final detector within ≈ 1 year?

Tile tester needed for:

- Quality assurance (reject bad tiles)
 - Datasheet for every tile (lab conditions!):
 - Gain & $V_{\text{Breakdown}}$
 - Noise (Darkrate & Crosstalk/Afterpulses)
 - Saturation
 - Mip Response
- } UV-LED
- } Sr90 Source

Challenge: 8 million tiles in 1 year (5 days a week, 8h a day)

=> **1 second** · **n** per tile! (n tile at a time – limited by Sr90 activity)

How can this be done?

=> Scalable prototype of a **fully automatic** and **fast** tile+SiPM test system

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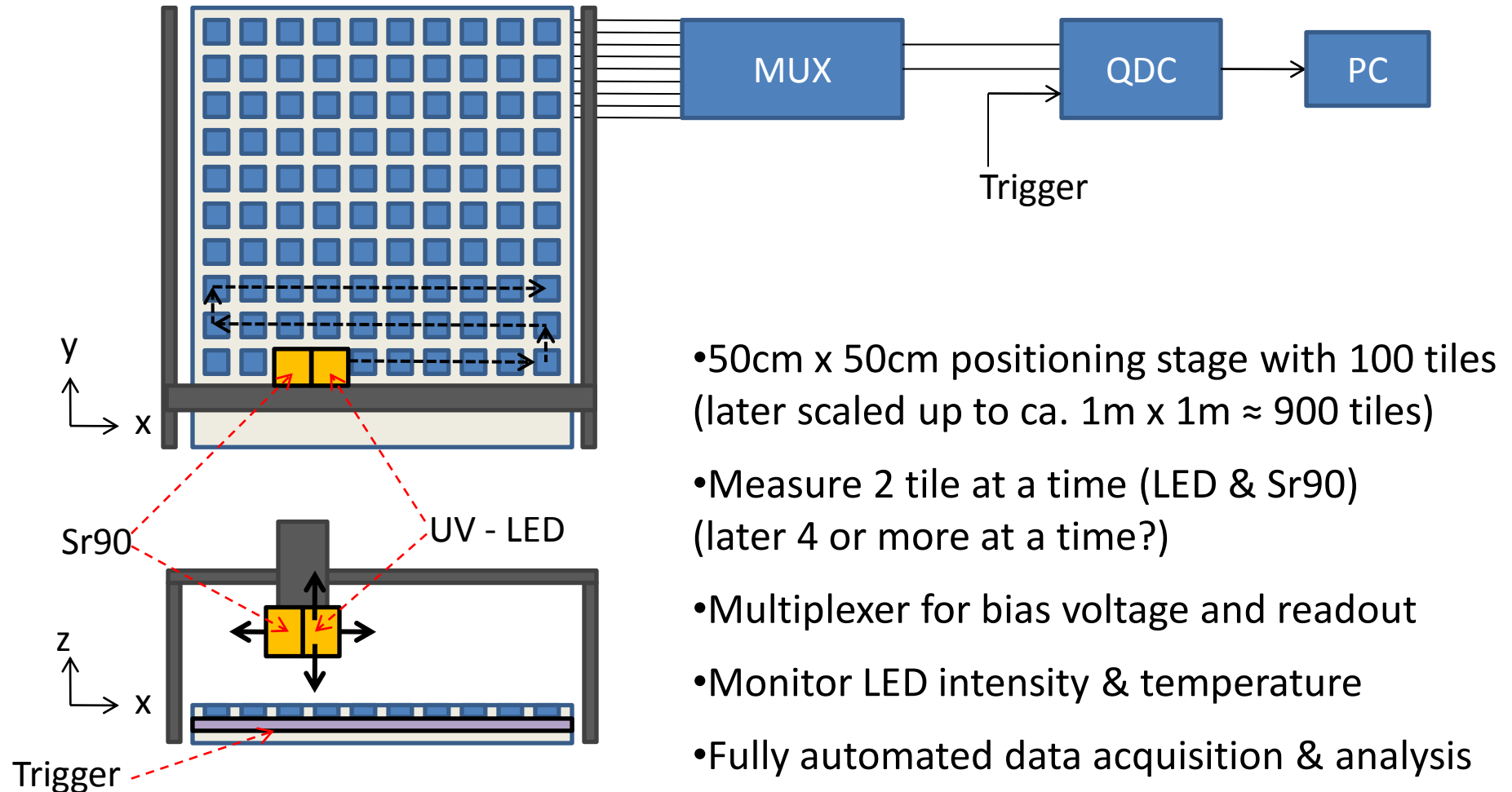
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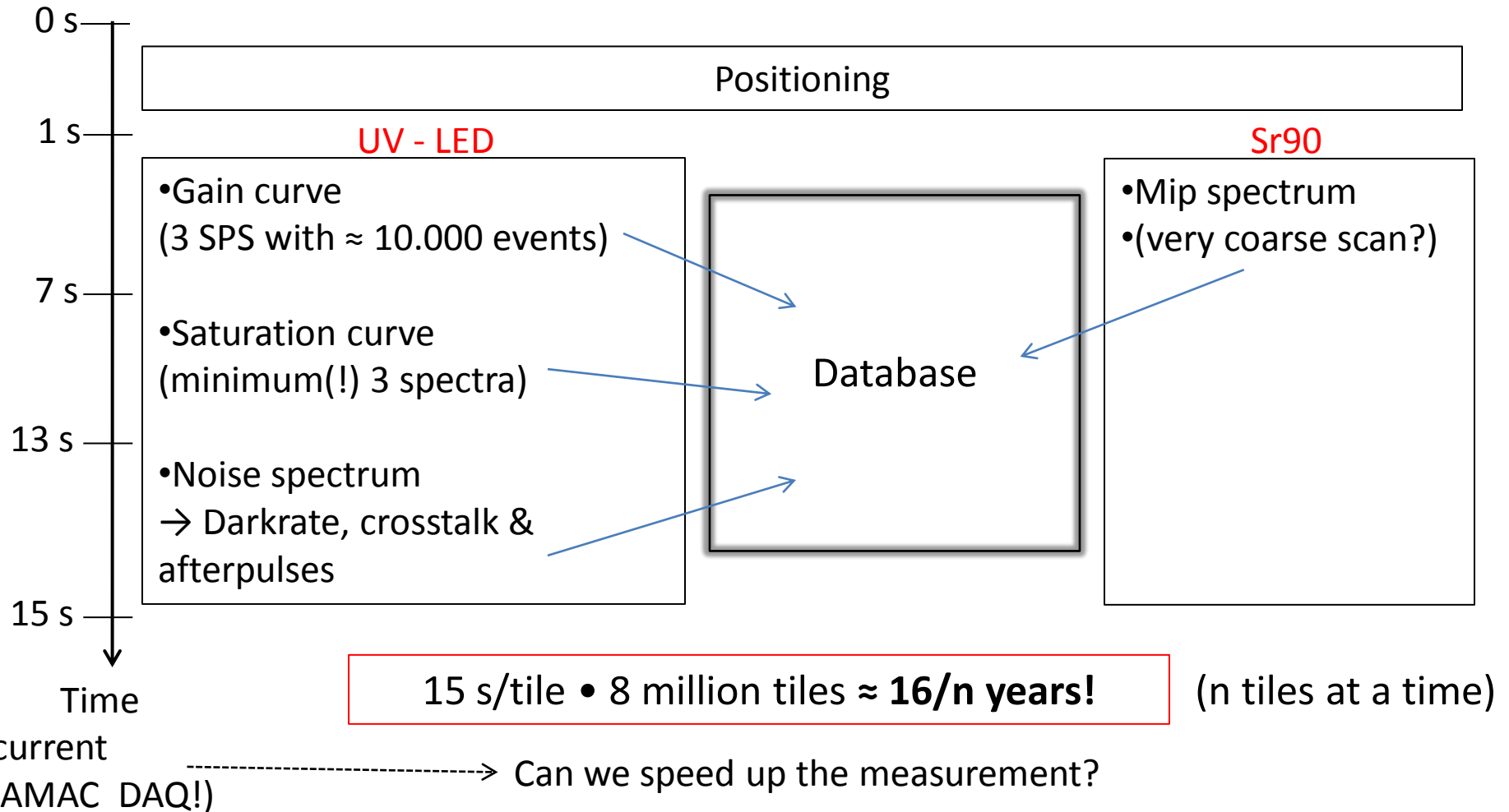
Extra study: Temp. coefficient cannot be measured for every tile
=> SiPM-to-SiPM variation study of the temp. coeff.
=> can we use a universal correction?!

Planned Prototype

Positioning Stage



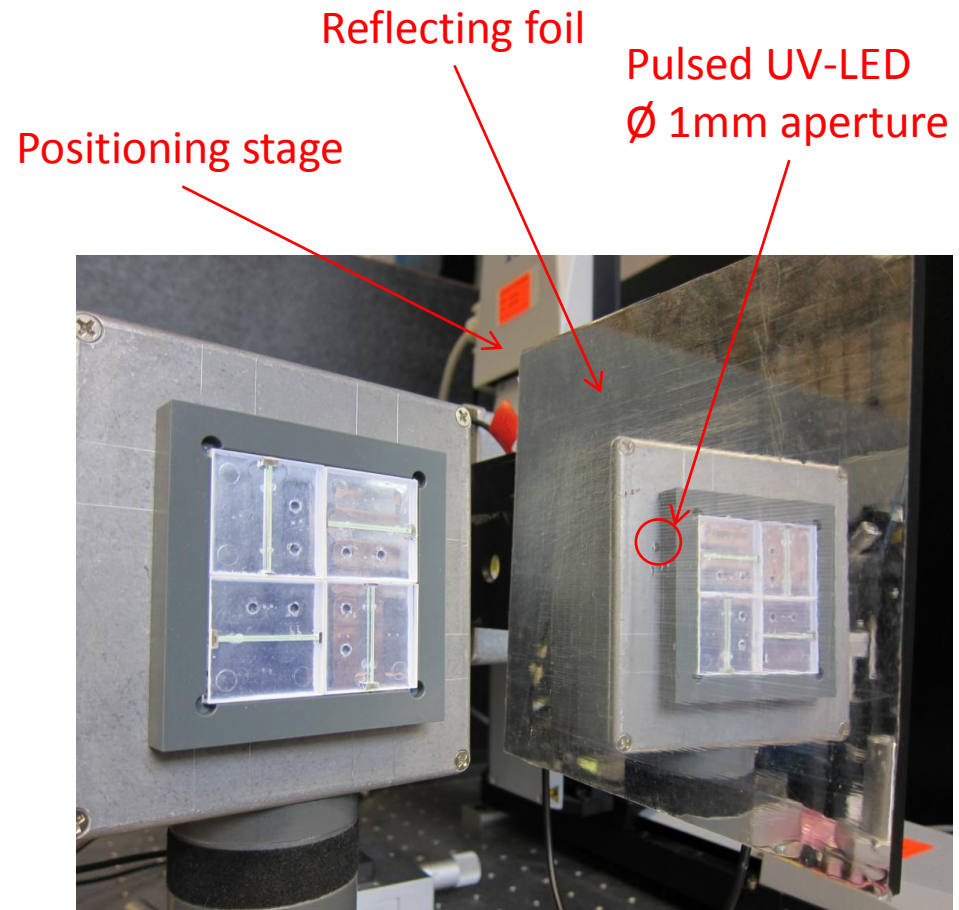
Data Acquisition



First Test Measurement

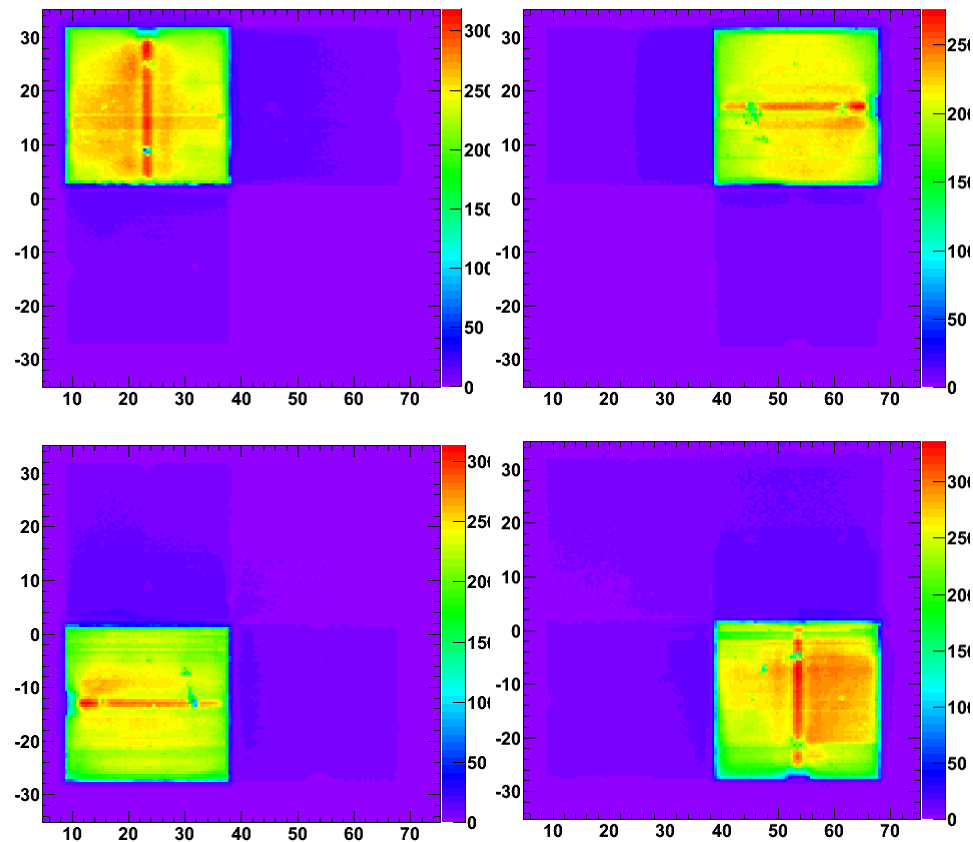
First Tests with a UV-LED

- Tile scan (0.5mm steps) with a pulsed UV-LED
- 4 tiles read out individually (QDC)



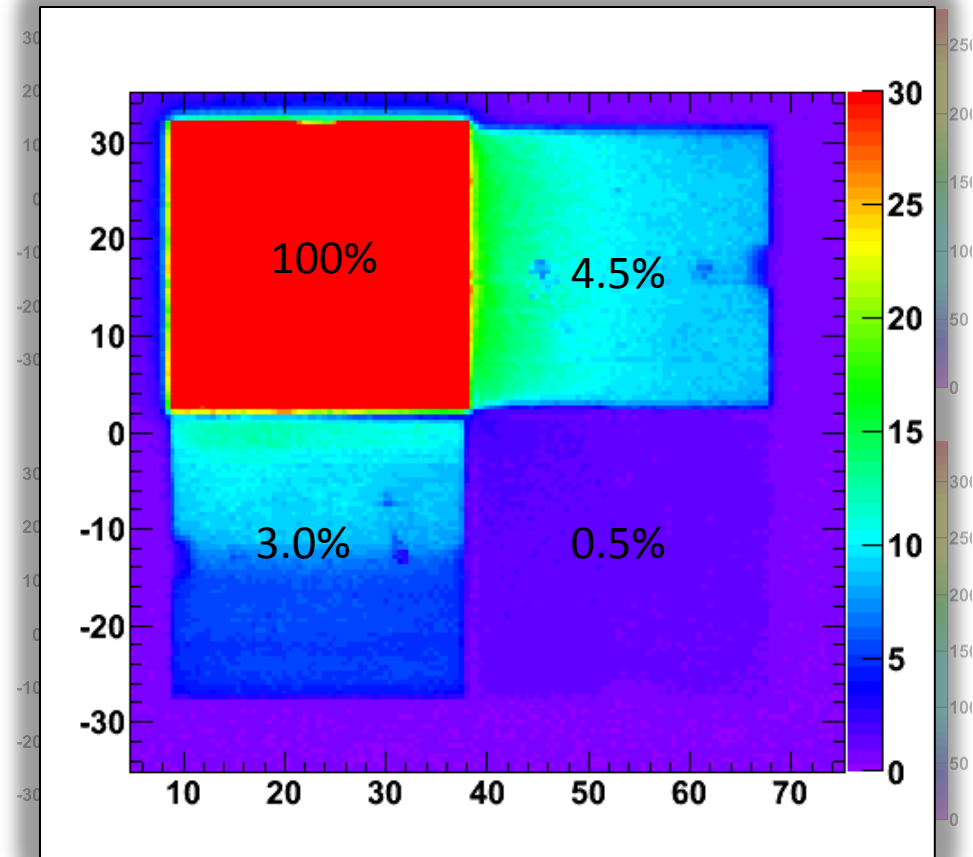
First Test Measurement

- We can record SPS
- Tile structure visible
- Coarse scan with UV-LED for tile quality assurance?
- MIP response looks different!
(LED: scintillation light + UV-light & surface reflections!)
- Crosstalk effects visible



Off-Topic: Tile Crosstalk

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- Tile structure visible
- Coarse scan with UV-LED for tile quality assurance?
- MIP response looks different!
(LED: scintillation light + UV-light & surface reflections!)
- Crosstalk effects visible
(from scintillation + UV)



Thanks

& I appreciate your input!