How the Photons find the SiPM
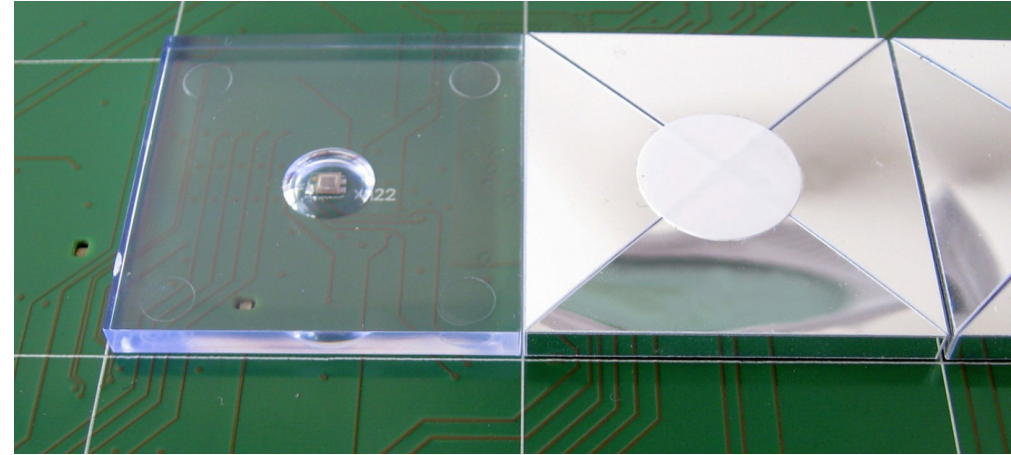
Fabian Hummer
fabian.hummer@kit.edu

Contribution to the
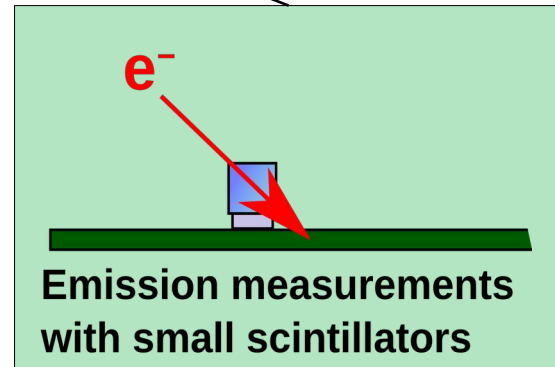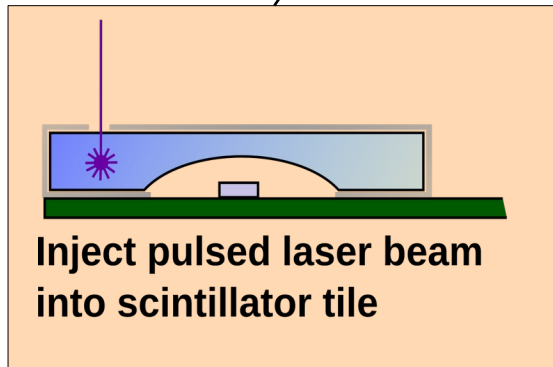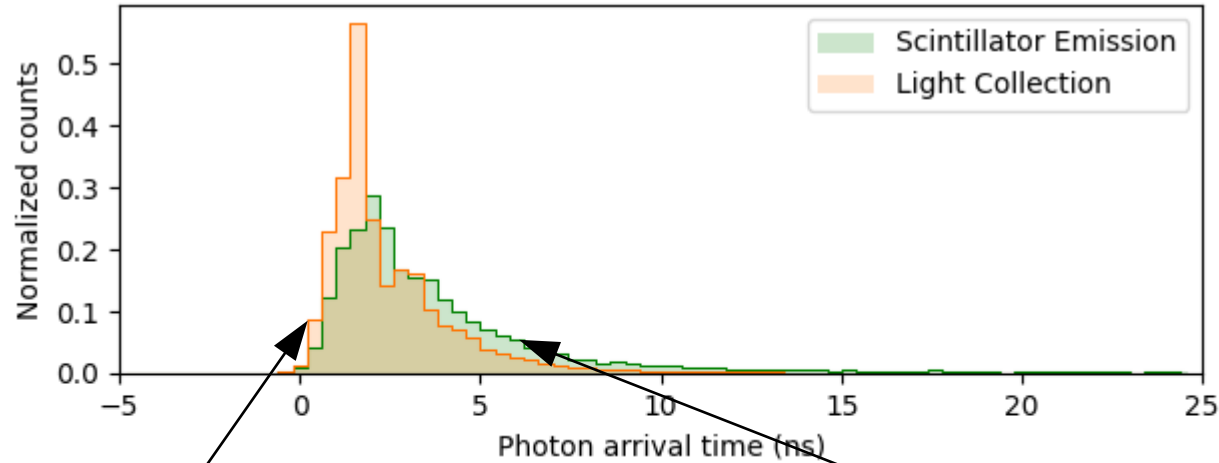EURIZON Detector School
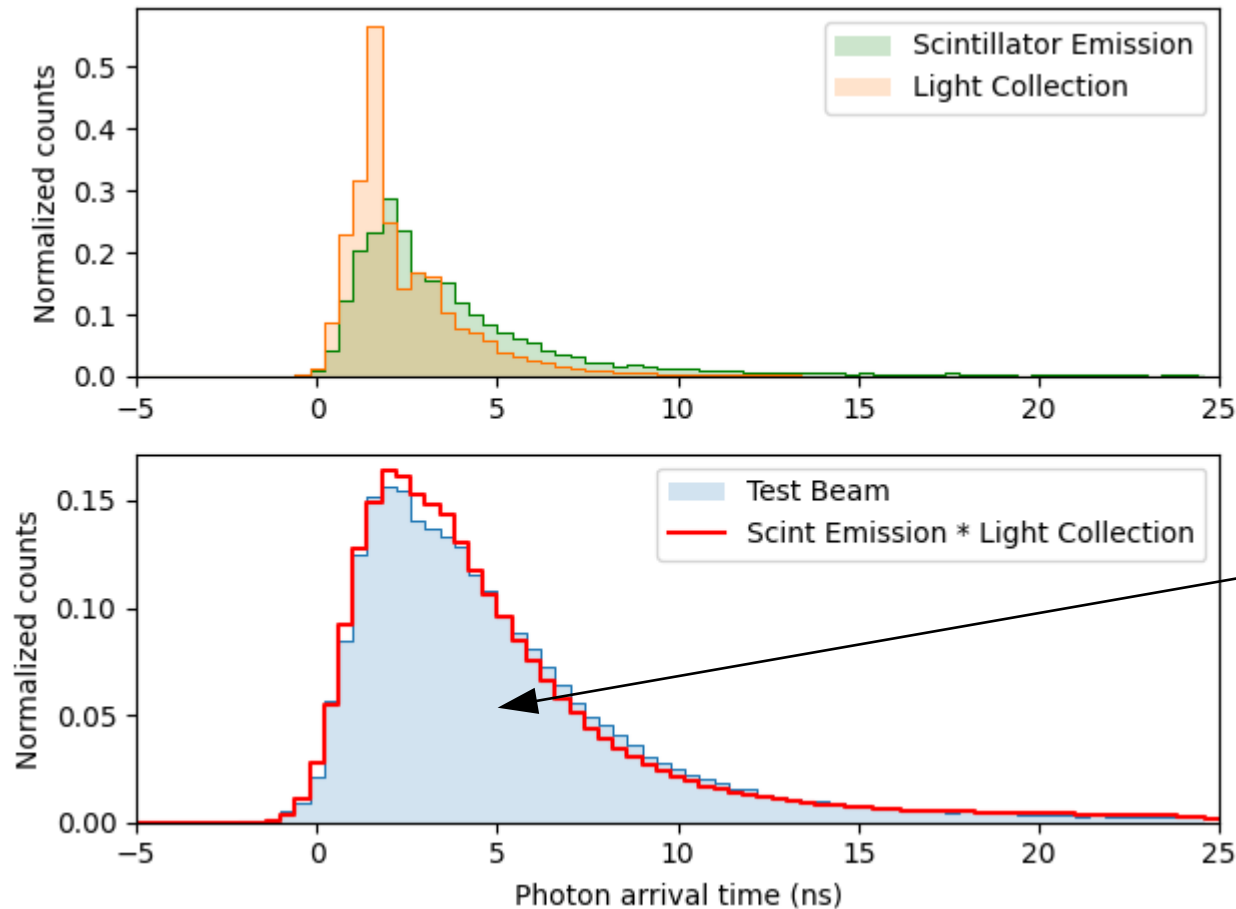
Jul 27, 2023

What is SiPM-on-Tile?

- Plastic scintillator tiles read out directly by a SiPM

- Developed by the CALICE collaboration for highly granular calorimeters

- SiPM sits directly on the PCB

- Design optimized for

  – Light yield

  – Automatic assembly (pick-and-place machine)
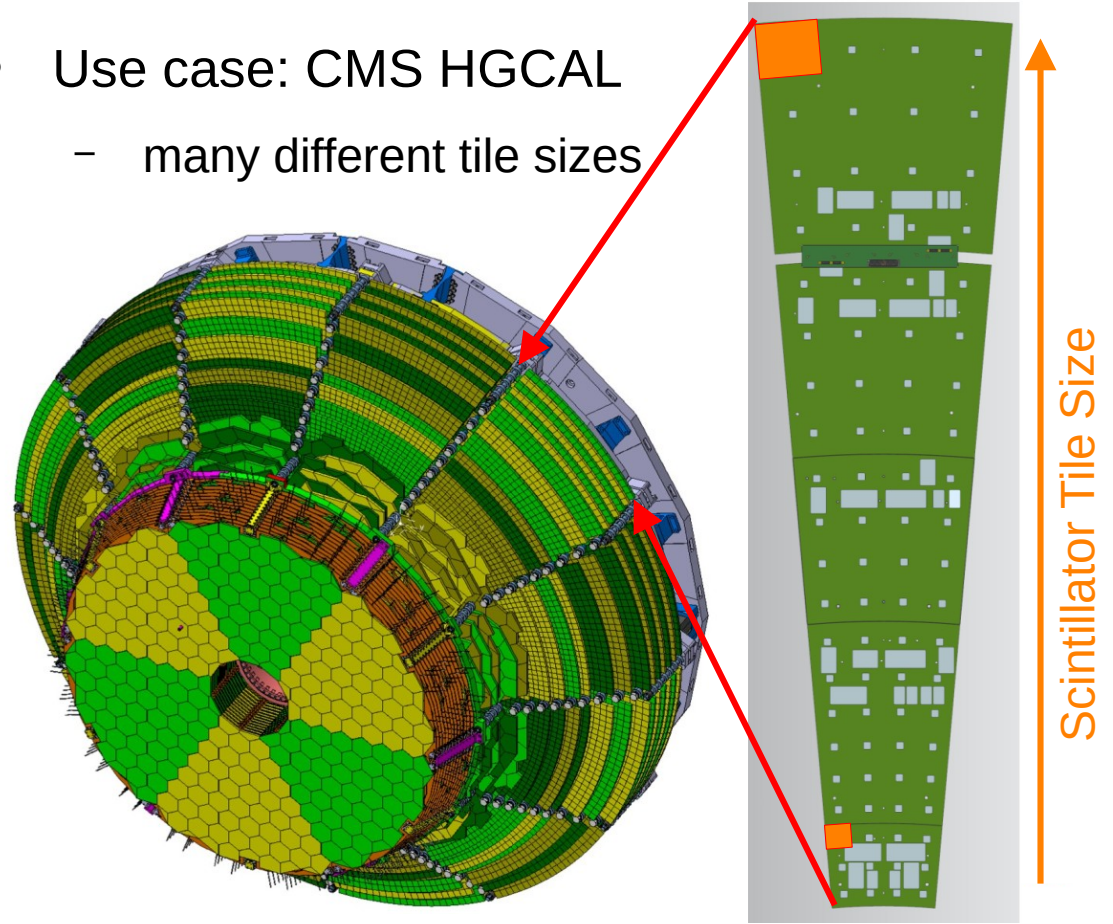
Signal = Scintillation * Light Coll.

Inject pulsed laser beam into scintillator tile

Emission measurements with small scintillators

Signal = Scintillation * Light Coll.

So what?

- Different processes in SiPM-on-tile

  – Scintillation

  – Light collection

  – Light measurement & DAQ

- Detailed insights from measurements
  → verify Geant4 simulation

- Analyzed light yield and time resolution for different tile sizes and SiPMs.

- Use case: CMS HGCAL

  – many different tile sizes

Scintillator Tile Size

Interested?

Read the full story at

https://publications.mppmu.mpg.de/?action=search&language=en&mpi=MPP-2022-372