Detector Lab's

Technical Seminars

PRISMA DETECTOR LAB

On scintillation detectors for Cherenkov timing in medical imaging

Katrin Herweg

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June 29th 2026 at 14:00

Curie Room, Staudingerweg 7, Building 2412, Room 03.431 (3rd floor – West)

Scintillation detectors are a staple in both nuclear medicine and radiology where they allow to measure both radioactive decay products and X-rays. Their capability for high timing performance has enabled the development of time-of-flight-based imaging techniques like time-of-flight positron emission tomography (ToF-PET), which has been the gold standard in high resolution PET imaging for many years with a timing resolution of around 200 ps (FWHM). Recently, researchers have investigated Cherenkov radiation as a faster emission mechanism than scintillation to further improve the achievable timing resolution in ToF-PET. However, low Cherenkov light yield and simultaneous emission of Cherenkov and scintillation light are a difficult basis for Cherenkov timing in medical imaging. I will present the DIGILOG project's approach to enable Cherenkov timing in ToF-PET using segmented SiPMs (µSiPMs) and BGO as a scintillator. A simulation study was performed to test different segmentations and find an optimal one for prototype production. First test measurements of differently sized µSiPMs show promise for the approach and the chosen segmentation. The expected impact of successful Cherenkov timing on ToF-PET performance will be discussed.

Katrin Herweg studied Physics at RWTH Aachen University, where she successfully completed her Master's degree in 2020. In 2021 she started her PhD in Physics under Prof. Volkmar Schulz with a focus on detector physics for positron emission tomography. During her PhD she has researched fast timing scintillators, focusing especially on fast emission mechanisms like cross-luminescence and Cherenkov radiation. She was awarded third place in the NSS student paper competition for her work. Her PhD is currently in its final stages.