

Flexible X-Ray Imaging Detectors Using Scintillating Fibers

Thursday, September 7, 2023 5:45 PM (20 minutes)

Some medical and industrial X-ray imaging applications need to reconstruct an image on a flexible surface, so they use photographic film rather than electronic detectors. Current flat-panel X-ray imaging detectors are difficult to adapt to these applications. We will present the FleX-RAY project, which aims to create an electronic X-ray detector with the flexibility of photographic film, suitable for a variety of applications.

FleX-RAY uses a sheet of flexible scintillating fibers to detect X-rays and guide the scintillation light to arrays of silicon photomultipliers. The detector also self-reports its curved shape using optical waveguides with Bragg gratings in a flexible glass substrate, which act as curvature sensors. Multiple reconstruction algorithms have been developed, suitable for different X-ray energies.

In this contribution, we present the advances in scintillating fibers, self-shape-reporting sensors, and image reconstruction algorithms made by the FleX-RAY collaboration. We will also present simulations of the expected detector performance and results of the initial tests on the FleX-RAY prototype.

This project has received funding from the European Union's Horizon 2020 Research and Innovation Program under grant agreement No. 899634.

Your name

Scott Wilbur

Institute

University of Sheffield

Email address

s.h.wilbur@sheffield.ac.uk

Primary authors: COMANESCU, Brindus (Optoelectronica 2001 S.A.); ANASTOPOULOS, Christos (University of Sheffield (GB)); ASFIS, Giorgos (TWI Hellas); MAGUIRE, Helen Ruth (University of Sheffield (GB)); KOCH, Jannis (Fraunhofer HHI); LOHWASSER, Kristin (University of Sheffield (GB)); LINDBLOM, Magnus (Research Institutes of Sweden); ANGELMAHR, Martin (Fraunhofer HHI); MARINOS, Nikolaos (TWI Hellas); PANAGOPOULOS, Nikos (TWI Hellas); WILBUR, Scott (University of Sheffield (GB)); MARGULIS, Walter (Research Institutes of Sweden)

Presenter: WILBUR, Scott (University of Sheffield (GB))

Session Classification: Application in life sciences and biology

Track Classification: X-ray and Gamma Ray Detectors