Contribution ID: **124** Type: **poster**

Flexible X-Ray Imaging Detectors Using Scintillating Fibers

Wednesday 15 September 2021 13:00 (1 minute)

We will present designs and simulations of a novel X-ray imaging detector. The intent of the FleX-RAY project is to create a digital X-ray detector that is capable of producing high-resolution images, is flexible enough to produce an image on a curved surface, and is capable of self-reporting its final shape.

The X-rays will be detected on a sheet of scintillating optical fibers, which will guide the scintillation light to single-photon avalanche photodiodes. This setup allows the electronics and hardware to be moved out of the path of the X-ray beam, limiting the need for additional shielding. Self-shape-reporting will be achieved using a flexible ultra-thin glass foil substrate with optical waveguides and Bragg gratings, processed by femtosecond laser point-by-point writing. The functionalized glass substrate allows precise measurement of strains, which can be used to calculate the shape.

This presentation will describe the results of simulations of the detector using a range of materials, geometries, and X-ray sources. By modifying these parameters, we can optimize the detector for various applications.

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Session Classification: Poster Session 2 (X-ray and Gamma Ray Detectors; Applications in Nuclear Physics and Nuclear Industry; Detectors for FELS, Synchrotrons and Other Advanced Light Sources; Detectors for Neutron Facilities; Novel Ionising Radiation Detection Systems)

Track Classification: X-ray and Gamma Ray Detectors