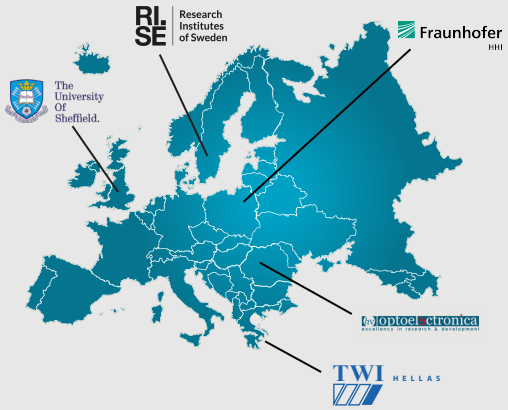
Project Partners

TWI Hellas is the coordinator of project FleX-RAY. In addition to project management activities, TWI Hellas is in charge of developing the hardware/firmware of the electronics and leads the characterisation of the proof-of-concept detector.

RISE heads the development of flexible scintillating fibres. It also works on issues such as optical fibre integration and connection, as well as participating in the material evaluation activities.

Optoelectronica-2001 SA leads the development of coupling methodologies to facilitate array connectors, studies and develops methods for termination of scintillating fibres on connector arrays in a way that minimises attenuation and optical crosstalk.

The University of Sheffield oversees the theoretical and numerical modelling of the scintillating fibres to establish light yield estimations. Image reconstruction algorithms are also developed by the University of Sheffield, including spatiotemporal filtering to identify the best signal hits from the noise and image postprocessing to improve the image quality.



FHHI is responsible for developing the 3D shape sensing glass foils, which are essential for the shape self-reporting property of our novel X-ray sensor. Besides processing optically integrated sensors and waveguides in ultra-thin glass foils (< 100 µm) by femtosecond laser application, efficient evaluation algorithms for a highly accurate recalculation of the 3D shape are realised.

FleX Ray

A flexible means to a solid end

Inherently Flexible X-ray, imaging detector using Single Photon Avalanche Photodiodes and scintillating fibres.

FleX-RAY Innovations

- Instead of a flat scintillating panel, ultra flexible scintillating fibres will transform the high energy X-Ray photons into optic wavelength ones and guide them towards the optical detectors..

- A digital imaging detector using single-photon capable avalanche photodiodes will be employed to count and time the photons to depict the X-rayed subject accurately.

- The electronics and hardware will be moved to the side so that they are not directly exposed to the radiation. This way, the hardware will only be subject to scattered radiation, limiting any degradation to the scintillation material.

- The most suitable scintillating materials and fibres will be developed and tested to achieve the highest performance. Different materials in the fibres could result in devices tuned for specific applications.

-Self-shape reporting will be done with light waveguides and optical sensors integrated in flexible glass foils. A clear step forward from existing approaches.

Project Info

Being flexible implies that something can change, adapt to new circumstances and contexts to facilitate improvement, and contribute to the greater good. Flexibility as a state of mind and as a physical quality is at the core of FleX-RAY.

FleX-RAY is a bold project that explores a radical concept to change digital X-ray imaging. As its very name implies, the core innovation is the inherent flexibility of the X-ray detector. The multidisciplinary technical experts behind FleX-RAY envision constructing a photon-counting-based, flexible, digital X-ray detector that can self report its shape and be maintainable at the post-production stage. Additionally, the project will explore the possibility of minimising the time and radiation dose needed to produce digital X-ray images of curved shapes. All these benefits are achievable by developing, combining and testing the joint effectiveness of different technologies to determine the most appropriate fibres and scintillating materials, digital electronics and manufacturing solutions for the X-ray detector.

After all, "Flexibility is the great catalyst for change."

Contact

www.linkedin.com/showcase/flex-ray

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 899634.

Beginning : 01/09/2020
End date : 31/08/2023