Extreme X-ray imaging: Significant boost from black silicon

WHAT AND WHY?
Current X-ray imaging tools have severe limitations:
* high radiation doses ➔ patients exposed to dangerous amounts of radiation, high power consumption, bulky and expensive devices...
* lack of sensitivity ➔ slow scanning speed, blurry images, problems with linearity, limited applications...
This project proposes improvements in all the above areas using black silicon technology originally developed for solar cells.

HOW AND WITH WHOM?
The black silicon photodiodes were fabricated in Espoo Micronova - the national infrastructure for Micro and Nanotechnology. Testing and characterization was carried out at collaboration company facilities. The main partners included Detection Technology (Finland) and Baltic Scientific Instruments (Latvia).

RESULTS, IMPACT AND RECOMMENDATIONS
* 49% sensitivity enhancement as compared to commercial detectors verified with a company test setup.
* New start-up, ELFys, Inc., established to fabricate and sell the black silicon photodiodes for X-ray imaging market.
* Portable, low-dose yet accurate X-ray imaging tools e.g. for hospitals, food inspection, airports, military purposes.
* Recommendations: University's role to be made more clear when a start-up is formed.

What next?
* ELFys, Inc. takes over and seeks for rapid growth.
* The academic research group expands the invention to black germanium and explores its potential in infrared and gamma-radiation.