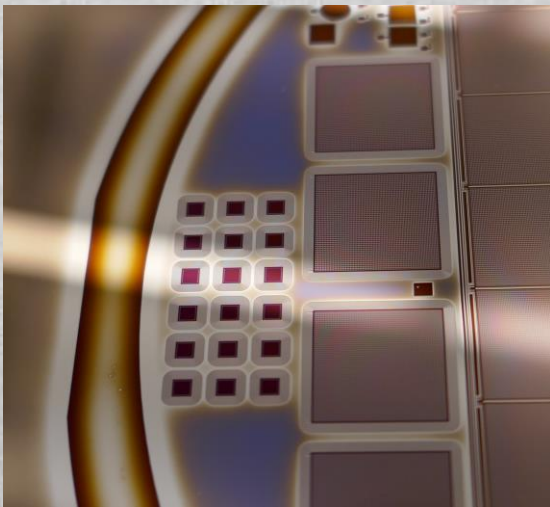
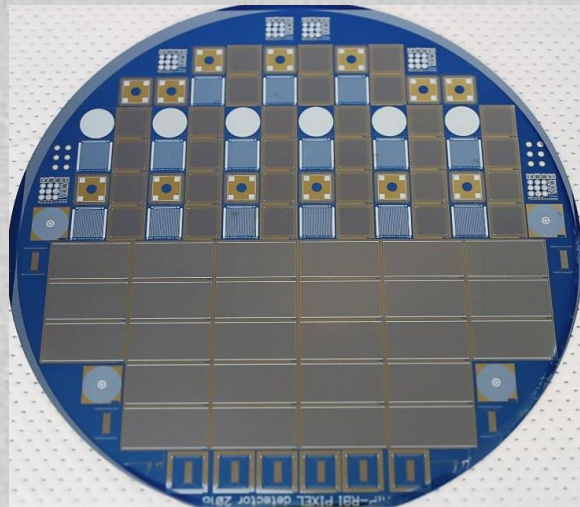


<http://lnr.irb.hr/PaRaDeSEC/>

The objective of PaRaDeSEC (Particle and Radiation Detectors, Sensors and Electronics in Croatia) project is to establish at Ruđer Bošković Institute (RBI) a group and facility focused on semiconductor radiation detectors and related data acquisition electronics.



Picture of a silicon pixel detectors. Similar detectors are used for particle tracking applications at the CERN LHC collider experiments



150mm silicon wafer with different detector designs and test structures for laboratory measurements and irradiation tests

Semiconductor detectors are widely used in high-energy physics (HEP) experiments, nuclear safety monitoring, space missions and in various medical applications. Silicon pixel and microstrip detectors provide very precise spatial resolution while being cost-effective due to well-established semiconductor manufacturing technology. We focus especially on:

- X-ray / gamma detectors
- Radiation hard silicon detectors
- Associated read-out electronics, Data Acquisition (DAQ)
- Microelectronics interconnection technologies

Photon / X-ray / gamma detectors

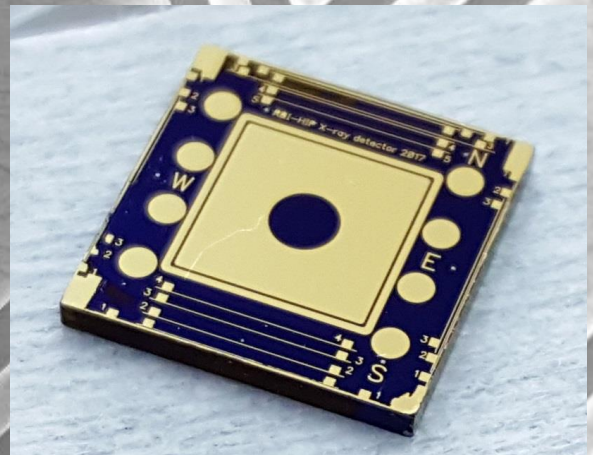
Applications include e.g.

- Medical imaging
- Nuclear safety, screening and monitoring
- Medical dosimetry
- Nuclear decommissioning operations



Cadmium Telluride (CdTe) X-ray pixel detector for medical imaging and dosimetry applications. The 52 x 80 pixel matrix layout is Flip-Chip bonding compatible with read-out CMOS ASIC (ROC) used within CMS experiment

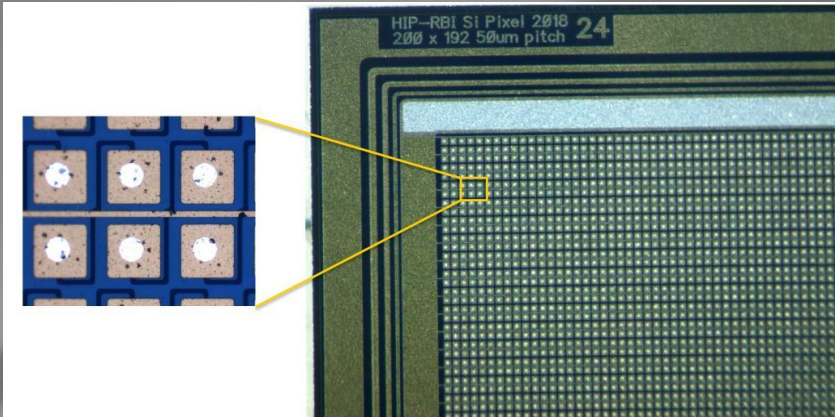
CdTe gamma detector nuclear safety, dosimetry and radiation monitoring applications



CdTe X-ray gamma pixel detector with 16 channels that can be connected into multichannel analyzer. Detector of this kind has potential use e.g. for nuclear decommission applications

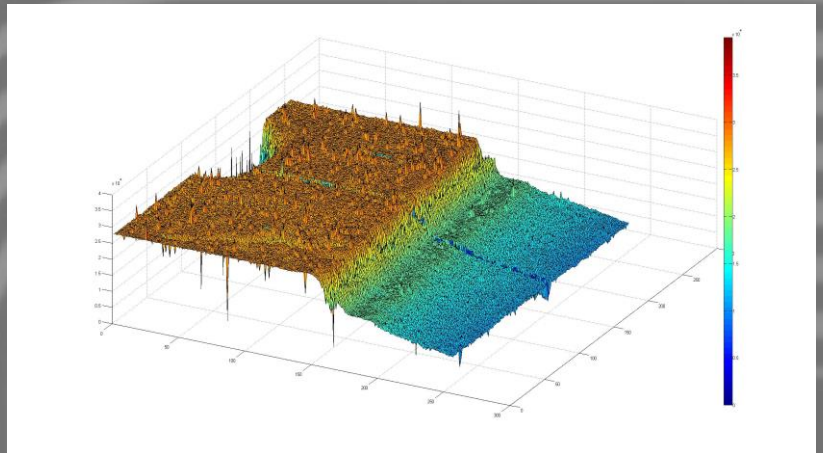


Development of radiation hard silicon particle tracking detectors for future CERN LHC Upgrades

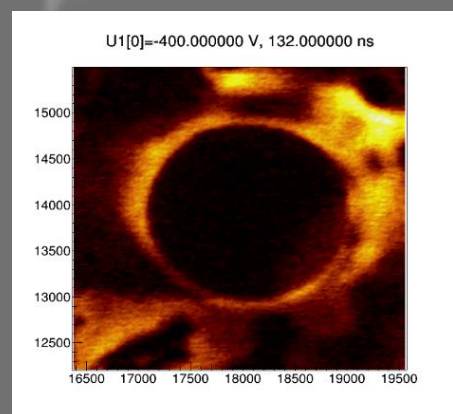


We have large interest on applications of a new processing technology, Atomic Layer Deposition (ALD), which provides significant potential for improve the performance of semiconductor detectors. The development of advanced radiation detectors is closely related with scientific activities of RBI Division of Materials Physics having a large variety of characterization and spectroscopy tools for semiconductor materials.

3D spatially resolved signal measurement of a pixel detector. The measurement has been carried out at the Ruđer Bošković Institute Accelerator Laboratory micro-focused beam line



RBI Accelerator Laboratory micro-focused beam line during a measurement campaign

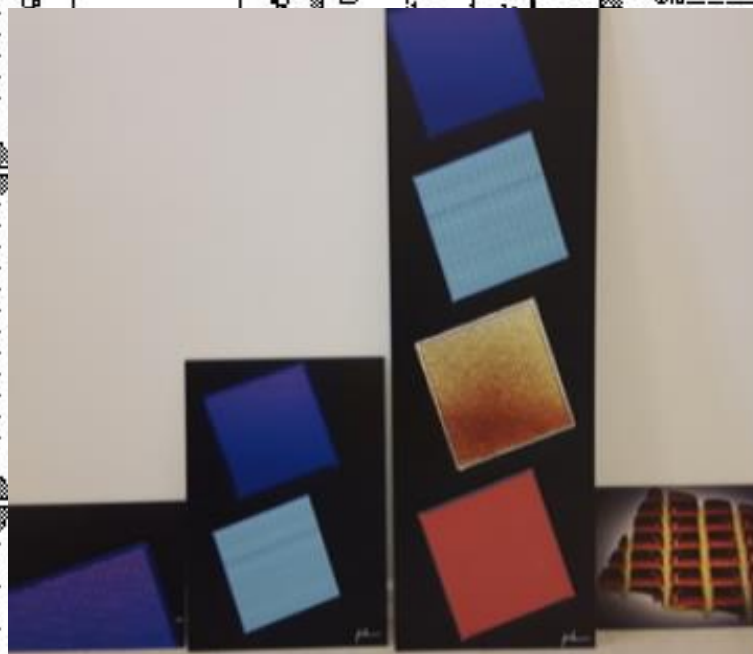


Time resolved moving charge around a pixel recorded at the RBI Accelerator Laboratory micro-focused beam line

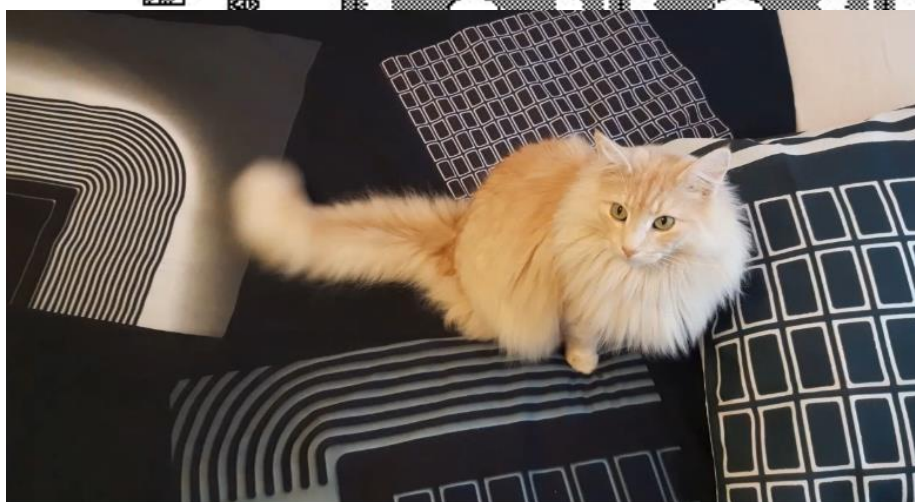
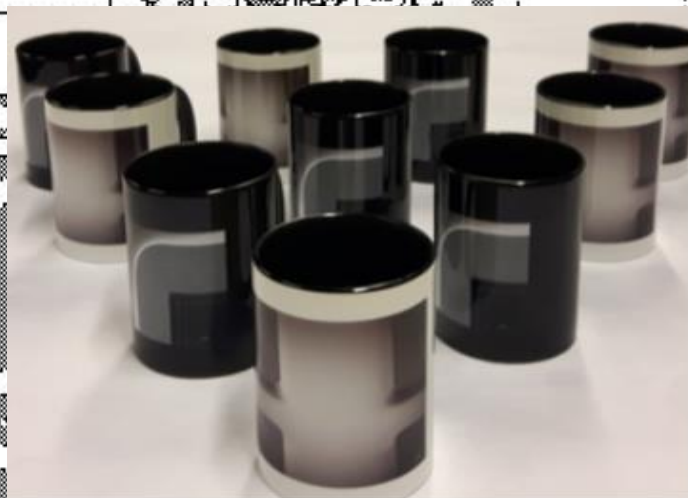
Handwritten signatures and initials, including '70' and 'Frank H...'

When science meets contemporary arts

Electrical TCT measurement data transferred to contemporary arts. Each colored square consists of about 70 000 TCT data points



Detector microstructures transferred into coffee mugs



Microstructure patterns of detectors converted into bead sheet set

This brochure is part of a project that has received funding from the **European Union's Horizon 2020 research and innovation programme under grant agreement N°669014**. The content of this brochure is the sole responsibility of the RBI and can in no way be taken to reflect the views of the European Union.

