



XI national conference with international participation
ELECTRONICA 2020 23-24 July



Expanding Potential in Particle and Radiation Detectors, Sensors and Electronics in Croatia

Post Doctorate Research Advisor at the ERA Chair PaRaDeSEC Project in Croatia with focus on the Radiation-Hard Particle Detectors, specialising in their Research and Development, Characterization and Implementation

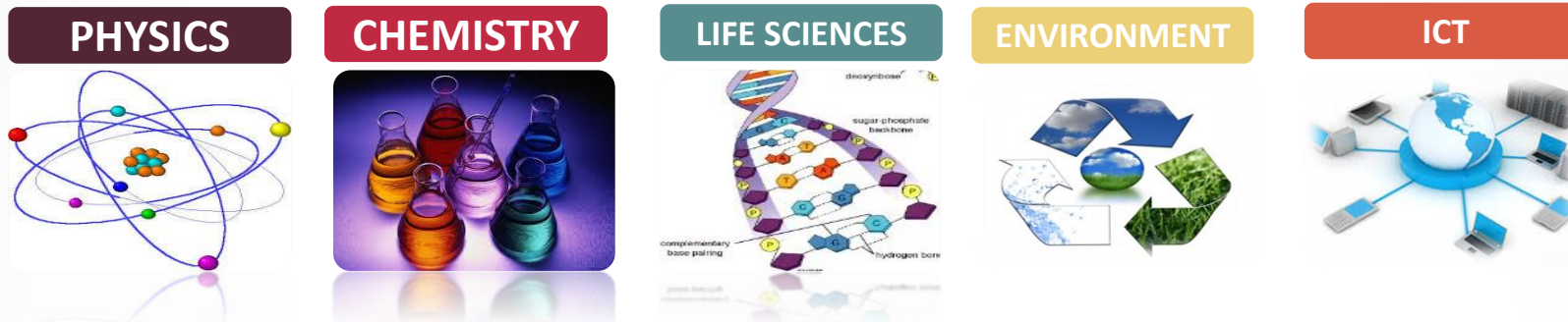


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On the behalf of the PaRaDeSEC Project

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<http://paradesec.irb.hr>



900 employees of which 360 permanent, 290 Post Doctoral and PhD students



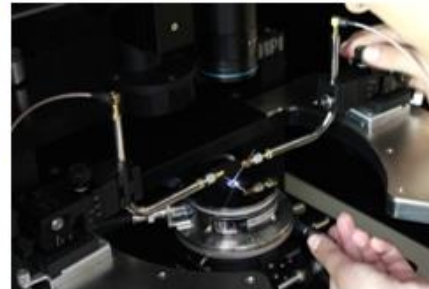
Mission:
Excellent science
Strong involvement in higher education
Leading contribution to the growth of the national economy

Vision:
Croatian centre of scientific excellence
Recognized research institution at international level

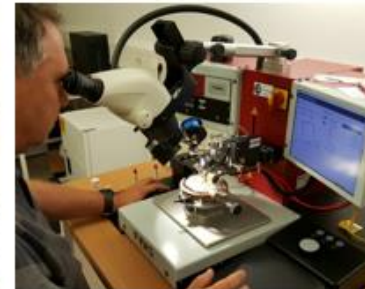
R&D Infrastructure at the CDSE



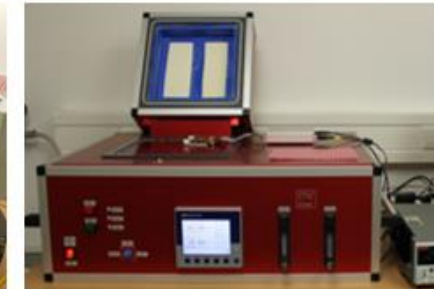
Scanning TCT setup



Probe station



Wire bonder



ColdBox setup

Legacy Infrastructure

- Accelerator Complex - Largest Experimental Complex in Croatia
- Gamma irradiation facility – 2PBq ^{60}Co
- Neutron generator



6.0 MV EN Tandem Van de Graaff accelerator



1.0 MV HVE Tandetron accelerator

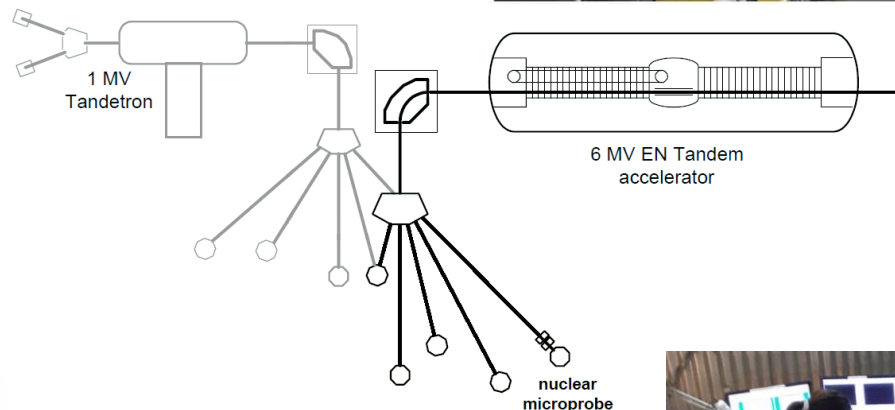


Experimental hall



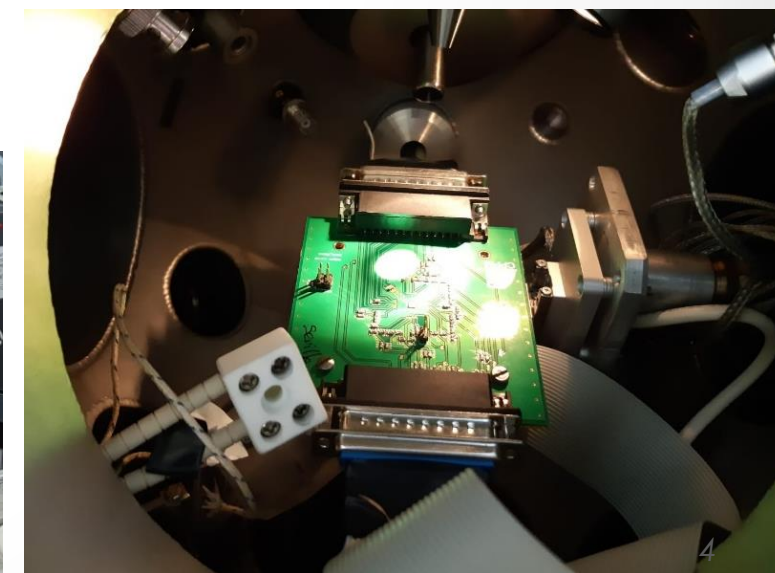
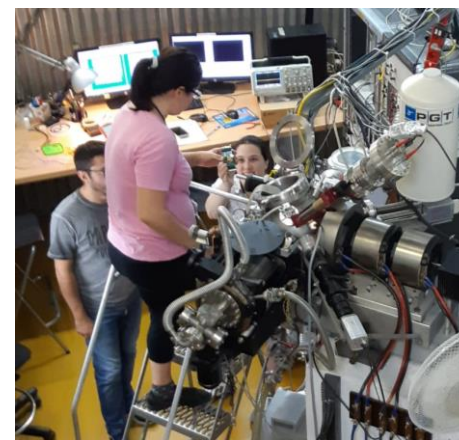
^{60}Co facility

At RBI Material Physics and Chemistry Department
Large selection of spectroscopic tools (PL, DLTS, Raman etc)



Other existing beam lines of EN Tandem accelerator:

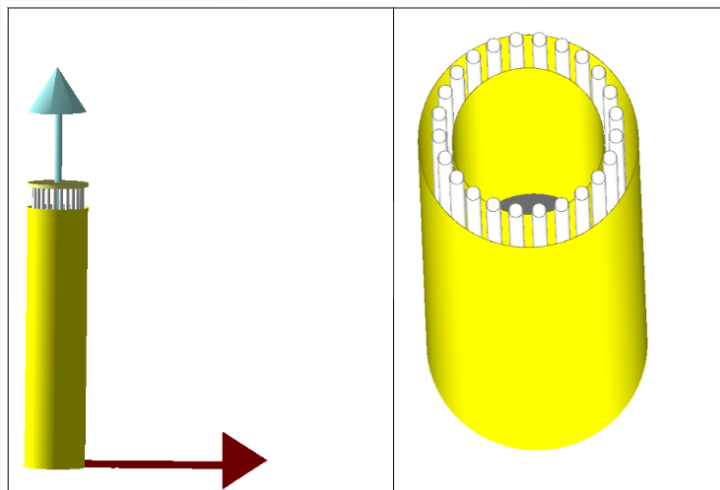
- IAEA beam line - routine PIXE/RBS
- TOF ERDA
- Nuclear reactions chamber
- High resolution PIXE / ion implant.



Nuclear Microprobe

- ◆ Two accelerators, 6.0 MV Tandem Van de Graaff and 1.0 MV Tandetron
- ◆ Protons (0.4 to 8 MeV), ions up to ME/q² ratio of 15 MeV
- ◆ Beam spot size can be as low as 250 nm, in normal use ~few μm
- ◆ Scanning area from 1.5 mm down to tens of μm

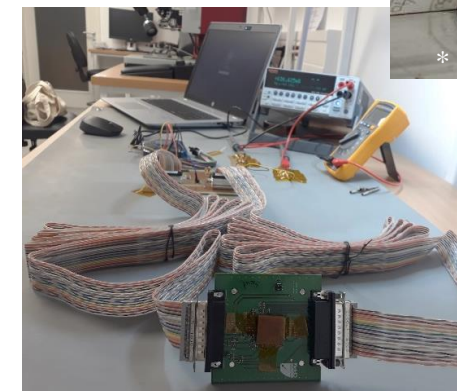
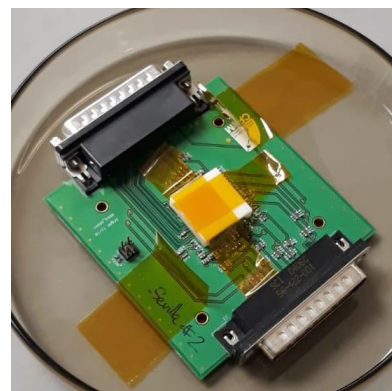
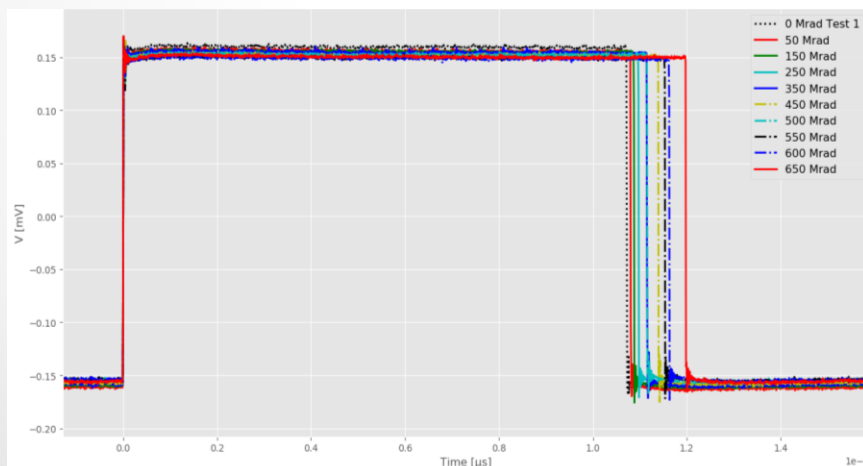
⁶⁰Co facility



- Isotope life time – 5.22 years
- Main decay mode – 2 photons (1.17 MeV and 1.33 MeV)
- The source consist of 24 rods with 20 cm active cobalt pencils
- Total activity of the source is 2 PBq
- Smaller samples could be placed in the center of the cylinder where the dose rate is 6.5 Gy/s or 2.4 Mrad/h
- A dose of 30 krad/h can be delivered at the corner of the room or 1.2 m from the center of the source



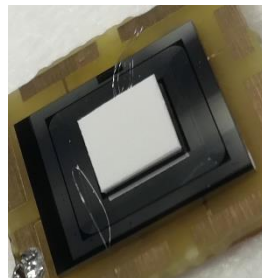
Test: CMD Reset Block LVDS real - from 0 to 650 Mrad



X-ray detectors for medical imaging and dosimetry

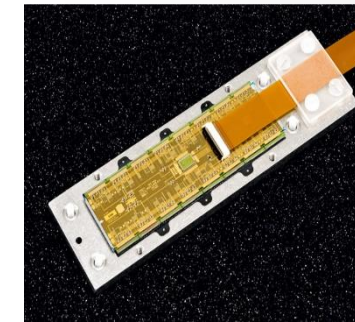
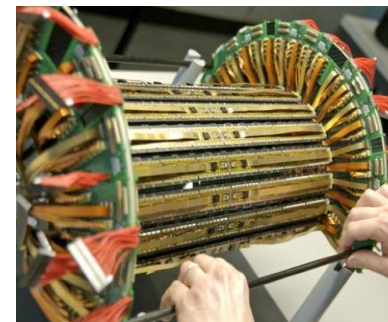


CdTe X-ray pixel detector

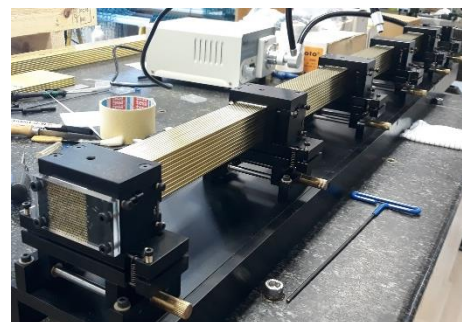
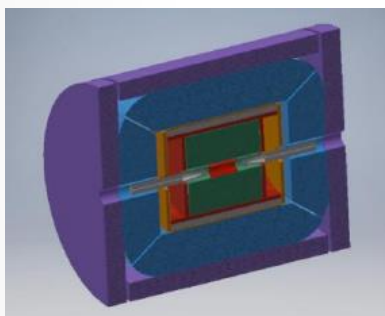


Si + Sci radiation detector

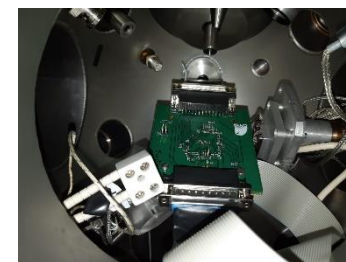
CMS Pixel modules characterisation and assembly



Next generation calorimeter for IDEA



Radiation tolerance studies by Beam tests and Radiation sources



RD53A VLSI chip



CMS Pixel Module



RD53A readout chip

Partners and International Collaborators

- Helsinki Institute of Physics and Micronova Nanofabrication Center, Finland
- Ioffe Polytechnic Institute, France
- Center for Semiconductor Detectors and University of Xiangtan, China
- INFN Bologna, Milano, Pavia, Pisa and Università degli Studi dell'Insubria, Como Campus, Italy
- Paul Scherrer Institute (PSI) and ETH Zurich, Switzerland
- Universidad de Sevilla, Spain
- Multiple research groups in the RD50 and RD53 collaborations at CERN



ELECTRONICA 2020

Thank you for your attention!



CDSE

Centar za detektore, senzore i elektroniku

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