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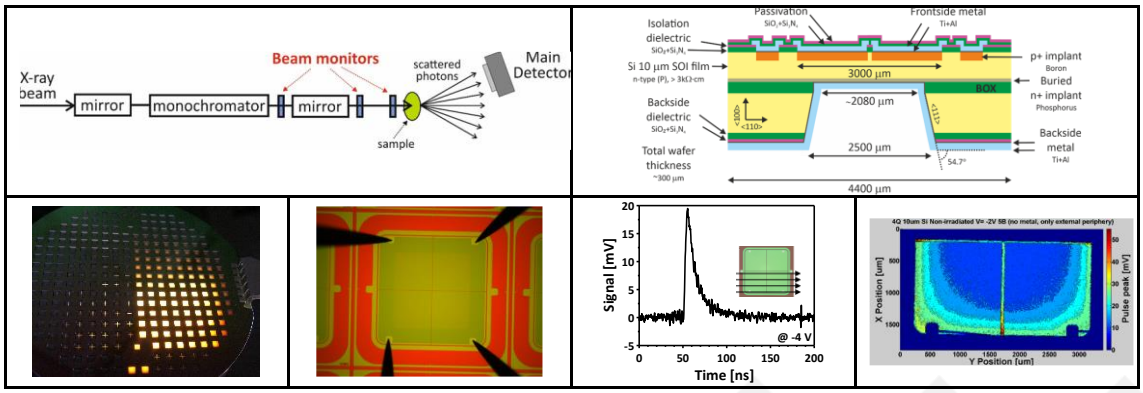
Bachelor/Master Thesis

At the Radiation Detectors Group (RDG) of IMB-CNM (CSIC)

Laser characterization of ultrathin silicon photodiodes for beam position and monitor applications

Description: Transmissive ultrathin semiconductor photodiodes are of interest for beam position and monitoring in X-ray synchrotron radiation beamlines and particle therapy medical applications. Innovative devices have been fabricated at IMB-CNM-CSIC cleanroom on ultrathin Si films with thicknesses between 10 µm and 1 µm. Good functional electrical characteristics have been obtained [1,2]. Recently, they have been also successfully tested in ALBA-CELLS synchrotron XALOC beamline.



Objectives: This TFG proposal aims to innovatively characterize the functional operation of these ultrathin radiation detectors with a pulsed laser beam transient current technique (TCT) [3].

Tasks: 1. State of the art on the research topic, 2. Experimental techniques (physical, electrical and Transient Current Technique (TCT) characterization), 3. Possible access to cleanroom facility inspection tools (3D optical profiler, FIB, SEM, EDX, AFM…). 4. Device characterization with TCT (signal response, collected charge, device uniformity, impact of laser wavelength). 5. Collect and interpret relevant data in order to make statements for scientific research (the results of this research are envisaged to contribute to some possible scientific publication).

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References: [1] https://doi.org/10.1088/1748-0221/12/01/C01004, [2] https://doi.org/10.1016/j.sse.2023.108756
[3] https://doi.org/10.22323/1.227.0032