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Characterization of detectors using MeV ion beams at the CNA

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In this talk, we will first introduce briefly the infrastructure available at the Centro Nacional de Aceleradores (CNA), based on a Pelletron 3 MV Tandem accelerator, model 9SDH-2, from National Electrostatics Corporation (NEC) and the Cyclone 18/9 cyclotron manufactured by Ion Beam Applications (IBA, Belgium), capable of accelerating protons and deuterons to 18 and 9 MeV, respectively. These facilities are employed for different Nuclear Physics applications, as the characterization and modification of materials using ion beams, the calibration of nuclear instrumentation, the irradiation of electronic devices and the research in Medical Physics. In the following, we will describe the fundamentals of the Ion Beam Induced Current (IBIC) technique and the Time Resolved-IBIC (TRIBIC) technique, tools employed to evaluate the spectrometric and transport properties of semiconductor detectors.

In close collaboration with researchers from IMB-CSIC and I3M, many detector prototypes have been studied, such as Si microdosimeters designed for dose control in proton therapy, silicon-based low-gain avalanche detectors (LGAD) for research in high-energy physics or SiC diodes that can work at high temperature, which makes them interesting in the field of nuclear fusion. This work will show some illustrative examples of the use of characterisation techniques available at the CNA.

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