PhD Studentship: *Development and characterization of Silicon Carbide detectors with integrated gain for harsh environments applications*

Closing date for application: 15th October 2021

Start date: 1st December 2021

Duration: 3 years

Funding: annual salary: 15343 € (+ 50% on top of the base salary for time period spent abroad)
+ 1800 € per year for travel expenses and research activity (starting from the second year)

University of Catania (IT) is inviting applications from **suitably-qualified graduates** for a fully-funded PhD studentship in the area of **detectors development**, in collaboration with the **Institute of Microelectronics of Barcelona IMB-CNM** (ES), the **Italian National Institute for Nuclear Physics (INFN)** and the start-up STLab (IT).

The project focuses on the development and characterization of novel solid-state detectors, based on **Silicon Carbide (SiC)**, for monitoring particle beams in harsh environments.

The proposed research project is in the general area of ionizing radiation diagnostics in hostile environments and in particular on the determination of fluxes and energies of neutrons emitted during nuclear fusion processes.

The objective of the PhD is to explore, both theoretically, through device simulations, and experimentally, by realizing and testing fabricated SiC sensors, the possibility of developing SiC sensors with integrated amplification, in particular using Low Gain Avalanche Diodes (LGAD)[1] amplification schemes, already demonstrated in Silicon devices but never in SiC sensors.

The development of on-chip amplification on Solid state detectors capable of operating on harsh-environments will open new opportunities for high-sensitivity monitoring.

The student will be based at the **Department of Physics and Astronomy "E. Majorana" in Catania** (Italy) and he/she will join a wider cohort of funded students across the Department. He will closely work also with Researches of the **INFN - Catania Division** and will receive training in detector modelling and radiation dosimetry, joining the University doctoral program, which offer a wide variety of dedicated high-level classes. He will be actively involved on the **modelling, fabrication and optimization of the SiC detectors**, strictly collaborating with the technology producer, **STLab** company in Catania (Italy), where the student will spend over one year, to realize the designed SiC devices

The student will also spend a period of up to 12 months at the **Institute of Microelectronics of Barcelona IMB-CNM** (ES), under the supervision of Dr. Giulio Pellegrini. There, he/she will have the opportunity to closely work with highly-qualified Researchers, further developing competencies in modelling and device fabrication. He/she will also actively participate to **experimental campaigns** in Italy and abroad for the detector characterization.

The student will have the opportunity to join a **stimulating research environment** and to work in close contact with an **industrial partner**, living in one of the liveliest cities in Sicily and spending up to 12 months in most exciting town in the Spain.

For **further information** about the project or any informal enquiries, please contact **Dr. Massimo Camarda** (massimo.camarda@stlab.eu) or **Prof. Lucia Calcagno** (lucia.calcagno@ct.infn.it).

[1] G. Pellegrini at al. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment" 765, 12 (2014)