

Master thesis offer

Deadline : 31-12-18

Design and fabrication of photonic crystals for improved particle detection

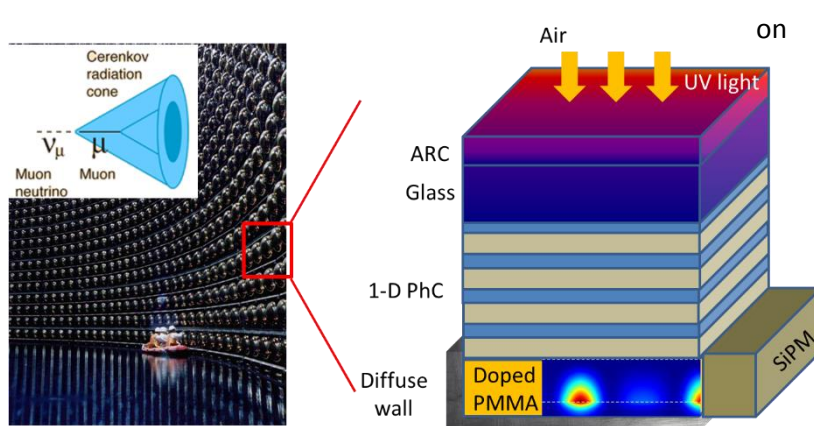
Institute of Materials Science of Barcelona ICMAB – CSIC.

Campus de la UAB, 08193 Barcelona, SPAIN

We search Master student for a master thesis in the design and fabrication of photonic crystal
Institute of Materials Science of Barcelona ICMAB – CSIC.

This project is oriented to the improvement of a silicon photomultiplier by the design and fabrication of a photonic crystal, based on strong interference effects.

Particle detectors often rely the detection of UV to IR light generated by particles as they travel and interact through a medium. Silicon photomultiplier is the technology of choice for sensitive detection of visible light but is currently limited by its small area of collection. This project aims



at improving the efficiency of these photodetectors by developing a “light trap”. In this light trap, a small Silicon photodetector is coupled to a much larger disk of PMMA doped with a wavelength-shifting fluorophore and covered by a photonic crystal. This scheme will help collect all the UV radiation, convert it into visible radiation trapped in the PMMA disk and eventually detected by the silicon photodetector.

The project involves:

- 1 Modeling and design of the photonic crystal to maximize the light trapped inside the disk.
- 2 Fabrication of the photonic architectures using physical deposition techniques.
- 3 Optical characterization of the final trap and implementation in real photodetectors.

Candidates must possess a background in physics or engineering with studies in photonics, materials, optics... Specific Knowledge in numerical simulation and programming (MATLAB) will be appreciated.

Only excellent candidates will be considered.

The selected candidate will have a contract up to 1 year.

Contact email:

Dr. Juan Luis García Pomar jgarcia@icmab.es

Dr. Agustín Mihi amihi@icmab.es