

Silicon Photonics-based Control and Data Acquisition System for Cryogenic Environments in Particle and Quantum Physics

Record number : OPR-575

Overview

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ADMINISTRATIVE UNIT(S)

Faculty of Engineering
Department of Electrical and Computer
Engineering
Interdisciplinary Institute for Technological
Innovation

LEVEL(S)

Master's degree
Ph.D.
Postdoctoral Fellowship

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation
technologique

Project Description

This project aims to design an optical communication system based on silicon photonics for applications in cryogenic environments, such as experiments in particle physics (e.g. nEXO, ARGO), high-energy physics and quantum physics (e.g. qubit control and readout).

The motivation for this project comes from the advantages the optical communication offers over classical electrical communication. As no current passes through optical fibers, a galvanic isolation between power and communication lines allows the system to be more resistant to ground loops and electromagnetic interference (EMI). Also, the system will be designed as a passive optical network (PON) and without a laser in the cryogenic modules, allowing for a very low power communication.

The objectives for this project include developing a prototype photonics chip for the system, developing a cryogenic packaging and optical coupling solution as well as developing the control system for the photonics chip.

This project will allow the interested person to develop knowledge in silicon photonic design. 100% of our students found a job before or at the end of their studies. The working environment at 3IT provides the experts, infrastructure and a motivated team required for the project.

Discipline(s) by sector

Natural Sciences and Engineering

Electrical Engineering and Electronic
Engineering, Physical Engineering

Funding offered

Yes

The last update was on 29 April 2021. The University reserves the right to modify its projects without notice.