detector seminar

SPEAKER: Edoardo Charbon

TITLE: **Massively parallel, three-dimensional photon counting: a versatile tool for quantum experiments**

DATE: 29 Mar 2019, 11:00

PLACE: 40-S2-A01 - Salle Anderson

ABSTRACT

CMOS SPADs have appeared in 2003 and soon have risen to the status of image sensors with the creation of deep-submicron SPAD technology. The format of these image sensors has expanded from 8x4 pixels of our first LIDAR in 2004 to 512x512 pixels of recent time-resolved cameras, and the applications have literally exploded in the last few years, with the introduction of proximity sensing and portable telemeters. SPAD based sensors are today in almost every smartphone and the promise is that they will be in every car by 2022. The introduction of SPADs in 3D-stacked ICs in 2015 is pushing the potential of this technology even further. The inherently digital nature of SPADs and the increased density of processing and computation over multiple silicon layers will soon enable deep-learning processors, neural networks directly on chip, thus enabling complex processing in situ and reducing the overall power consumption. Another recent trend has been the use of SPADs in qubit readout and control, thus making SPADs amenable to interface with quantum processors, due to SPAD sensitivity and the capability of operating normally at cryogenic temperatures. The presentation will conclude with a technical and economic perspective on SPADs and SPAD imagers, and a vision for SPADs and other cryo-CMOS circuits in quantum computing.

Organised by: Alessandro Marchioro