



POLITECNICO
MILANO 1863



Silicon Photomultiplier Technologies Developed at Fondazione Bruno Kessler

Alberto Gola

Fondazione Bruno Kessler

Thursday May 6, 2021, 10:30AM

Join us in a Zoom Meeting: <https://polimi-it.zoom.us/j/9050008004>

You are kindly invited to attend, including students and PhD students.

Abstract

Silicon Photomultipliers (SiPMs) are photodetectors with high internal signal amplification, featuring extremely high sensitivity, down to the level of a single visible photon, and excellent single-photon time resolution, down to 20 ps FWHM, achieved even with relatively simple readout electronics. Thanks to these characteristics, SiPMs are currently of great interest in several scientific, medicine and industrial applications. SiPMs are being evaluated for the detection of light signals in the vast majority of big science experiments planned for the future, from the HL-LHC upgrades (CMS, LHCb) to future Dark Matter, Neutrino and rare-event detection experiments (DarkSide, DUNE, nEXO), but also in commercial applications (nuclear medicine, such as PET, space and automotive LiDAR applications). In these fields, FBK is at the forefront of developments, collaborating with CERN and several other research institutions, in the scientific sector, and with important companies, for commercial applications.

The seminar will introduce the working principle of SiPMs, their internal structure as well as their most important characteristics, including sensitivity, time resolution and noise sources. The different SiPM technologies developed at FBK over the past ten years will be described, together with their optimization, design challenges and their use in various applications, such as big physics experiments.

Short Bio

Alberto Gola was born in Milano, Italy, in 1978. He received a "Laurea" degree (M.S.) in electronic engineering in 2003 and a Ph.D. degree in information technology in 2007, from the Politecnico of Milano, Milano, Italy. Between 2007 and 2009, he was with the Department of Electronics and Information Technology of the Politecnico di Milano where he worked on silicon drift detectors (SDDs), SDD-based gamma cameras, multichannel ASIC design, DAQ systems, optimal filtering, and signal processing. Since 2010, he is with Fondazione Bruno Kessler, Trento, Italy, where he currently holds the position of Chief Scientist, responsible for the development of custom Silicon Photomultiplier technologies. His research interests include the simulation, design and technology development of silicon photomultipliers and their customization for the needs of different fields, from medical imaging, to industrial applications, such as LiDAR, to space and big science experiments. Ongoing scientific collaborations and joint research activities he is part of include: CERN-CMS, the DarkSide-20k, DUNE, nEXO, JUNO-TAO.

Info: Andrea Castoldi, Politecnico di Milano (Andrea.Castoldi@polimi.it)