Department of Electrical Computer and Biomedical Engineering

Università degli Studi di Pavia

The award ceremony will take place on the Zoom platform.

Topic: 2021 IEEE Emilio Gatti and Franco Manfredi Best Ph.D. Thesis Award - 5th Edition

Time: Dec 16, 2021 03:00 PM Rome
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2021 IEEE Emilio Gatti and Franco Manfredi Best Ph.D. Thesis Award in Radiation Instrumentation

Award Ceremony
December 16th, 2021

IEEE NPSS
NUCLEAR & PLASMA SCIENCES SOCIETY
IEEE NPS Italy Chapter

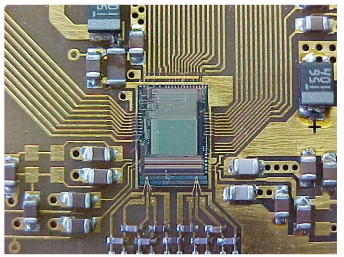
Department of Electrical Computer and Biomedical Engineering

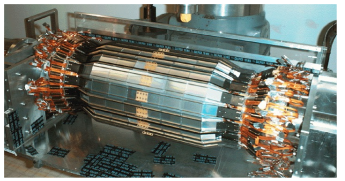
Università degli Studi di Pavia

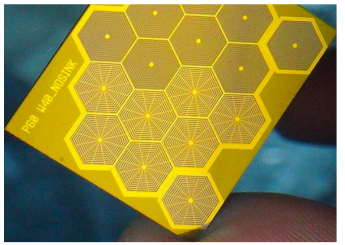
The IEEE NPS Italy Chapter is pleased to announce the fifth edition of the Award in memory of Emilio Gatti and Franco Manfredi. The award is presented to distinguished young scientists who have completed their Ph.D. thesis in the field of Radiation Instrumentation for fundamental and applied research.
The prize consists of 500 Euros and a certificate.

For more information about the award visit:

http://www.npss.polimi.it/GattiManfrediAward







Agenda

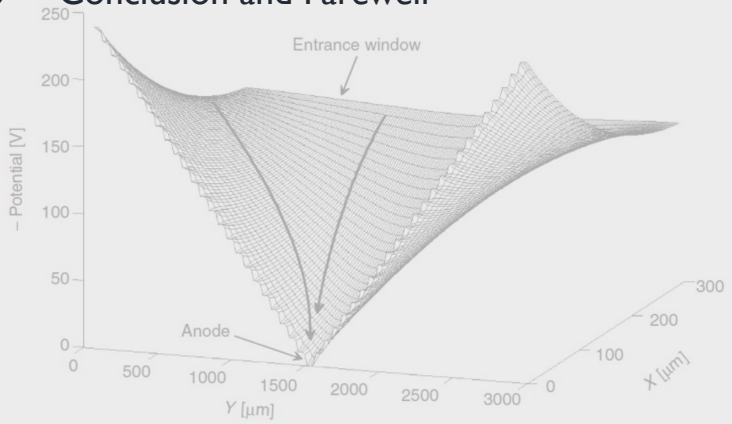
15:00 IEEE NPS Italy Chapter Chair Welcome
Gian-Franco Dalla Betta
Università degli Studi di Trento and INFN, Italy

15:10 "The DSSC soft X-ray Camera System with Mega-Frame Readout Capability for the European XFEL"
Matteo Porro
European XFEL GmbH, Germany

15:50 Award Ceremony

16:00 "A novel γ-sensitive detector apparatus for eV neutron spectroscopy applied to hydrogen-bonded systems"
Pierfrancesco Ulpiani – 2021 Awardee
Università degli Studi di Roma Tor Vergata, Italy

16:30 Conclusion and Farewell



Matteo Porro earned his Master's degree in Electronics Engineering and his Ph.D. in Radiation Science and Technology at Politecnico di Milano, Italy. From 2005 to 2015, Matteo Porro has been a research scientist at the Max Planck Institute for Extraterrestrial Physics and the associated Semiconductor Laboratory Munich, Germany. He was the coordinator of the ASIC design team. Among the other projects, he has been responsible of the development of the ASTEROID ASIC which has been used for the MIXS (Mercury Imaging X-ray Spectrometer) instrument of BepiColombo, a joint cornerstone mission of the European Space Agency and Japan Aerospace Exploration Agency for Mercury Exploration launched in October 2018. His ASIC development activity also includes the design of the readout for pnCCDs for optical astronomy and for experiments with the new generation of X-ray Free Electron Lasers. In 2015 he moved to the European XFEL (Schenefeld, Germany) with the role of coordinator and the P.I. of the DSSC project. The project aims at the development of a large format X-ray imager with mega-frame readout capability for photon science experiments. The first fully functional DSSC 1-Megapixel camera was installed at the European XFEL in the beginning of 2019. In 2010 Matteo Porro received the IEEE Radiation Instrumentation Early Career Award and in 2021 he received the IEEE Emilio Gatti Radiation Instrumentation Technical Achievement Award. He is author and coauthor of more than 120 publications on peer reviewed journals and conference proceedings.

The DSSC soft X-ray Camera System with Mega-Frame Readout Capability for the European XFEL

The DSSC camera was developed for photon science applications in the energy range between 0.25 keV and 6 keV at the European XFEL in the Hamburg area in Germany. The first complete, fully tested, 1-Megapixel DSSC camera, is successfully used for experiments at the Spectroscopy and Coherent Scattering (SCS) instrument and the Small Quantum System (SQS) Instrument. The detector system is at the moment the fastest existing 2D camera for soft X-rays.

The camera is based on direct conversion Si-sensors and is composed of 1024 x 1024 pixels. 256 ASICs provide full parallel readout, comprising analog filtering, digitization and in-pixel data storage. In order to cope with the demanding X-ray pulse time structure of the European XFEL, the DSSC provides a peak frame rate of 4.5 MHz. The first megapixel camera is equipped with Miniaturized Silicon Drift Detector (MiniSDD) pixel arrays. The intrinsic response of the pixels and the linear readout limit the dynamic range but allow one to achieve noise values of about 60 electrons r.m.s. at the highest frame rate.

The challenge of providing high-dynamic range (~10^4 photons/pixel/pulse) and single photon detection simultaneously requires a non-linear system, which will be obtained with the DEPFET technology foreseen for the advanced version of the camera. This technology provides lower noise and a non-linear response at the sensor level.