detector seminar

SPEAKER: Gabriele Bulgarini

TITLE: **Single-photon counting with superconducting nanowires: near unity efficiency and ultra-high time resolution**

DATE: 17 Nov 2017, 11:00

PLACE: 40-S2-D01 - Salle Dirac

ABSTRACT

Thanks to their sensitivity in the near infrared, low dark count rate, excellent timing properties and photon counting capabilities, Superconducting Nanowire Single-Photon Detectors (SNSPDs) are one of the most promising photonic technologies of the last decades. Our devices are constituted by a thin superconducting nanowire , that is operated at 2.5 Kelvin with a constant biasing current below the critical current. Once a single photon is absorbed in the nanowire, the superconductivity is locally broken. As a result, the biasing current is reflected to the amplification electronics producing a voltage pulse. Shortly after a detection event, the superconductivity is restored in the nanowire and the detector is available for detecting another photon. I will discuss our state of the art detectors featuring a broadband detection efficiency peaking higher than 92%, over 150 MHz photon detection-rate and low dark count rates. The photon absorption is optimized in a range from the near infrared to the telecommunication window . Furthermore, using our custom made cryogenic amplifiers, we reach record low jitter below 10 ps without compromising the detection efficiency of the device.

Organised by: Alessandro Marchioro (EP-ESE)