Superconducting Quantum Detectors

Mikkel Ejrnaes

CNR-SPIN, Via Campi Flegrei 34, 80078 Pozzuoli, Italy

An overview of current research activities of SPIN in the area of Superconducting Quantum Detectors will be given in the context of the state of the art of quantum science and technologies. These activities can be roughly characterized in three different objectives:

- 1. New applications of superconducting quantum detectors. Here will will show the most recent results concerning using SNSPDs for long distance Quantum Key Distribution systems, characterization of quantum light sources (using photon number resolving detectors), measurement control of quantum state of light (single photon generation, photon number doubling, tripling), and SNSPD channels in LIght Detection And Ranging.
- 2. Research and development of new capabilities of superconducting quantum detectors. Currently the research is focused on the *single photon detection in superconducting microstrips*, where we are working on anchieving long wavelength single photon detection ($\lambda > 1550$ nm) and Photon Number Resolving Detectors.
- 3. **Pursuing initiatives involving material science for future quantum technologies.** In the context of research for *new future technologies* we are pursuing initiatives to make Quantum Frequency Converter from GHz to Infrared light since this will be of key importance for communicating between future superconducting quantum computers.

Submitting/Contact Author: Mikkel Ejrnaes

E-mail:

mikkel.ejrnaes@spin.cnr.it