

PADERBORN PHOTONICS LECTURE

26.03.2019

P8.4.09

11:00

Infrared single-photon detection with superconducting nanowires

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Abstract:

A host of emerging 21st technologies rely on the ability to detect single photons at infrared wavelengths. Quantum key distribution allows secure communications over long distance fibre optic networks or even from ground to space. Single photon LIDAR systems allow eye-safe imaging over long distances. Single photon detection underpins fluorescence measurements in the life sciences and dose monitoring for laser cancer treatment. Single photon detection lies at the heart of optical approaches to quantum computing. My work focusses on high sensitivity, high speed and low noise single photon detection with superconducting nanowires. I will give an overview of the latest developments in superconducting nanowire single-photon detector technology, from materials aspects, through integrated devices and into applications.