

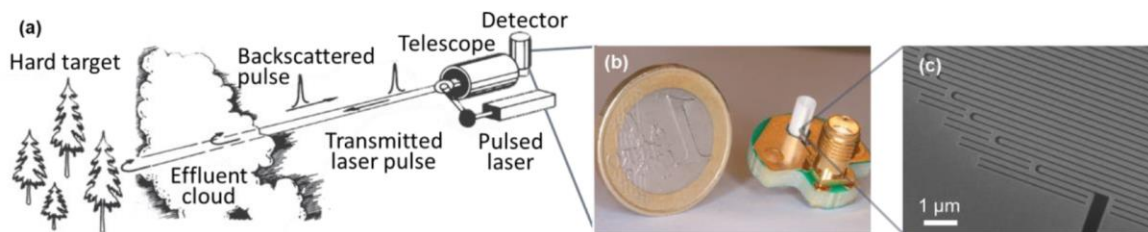
## Single photon Lidar

Contact: Val Zwiller, [zwiller@kth.se](mailto:zwiller@kth.se), Quantum Nanophotonics, Albanova, KTH

In this project you will help with the development of a quantum lidar, a radar operating with light pulses at the single photon level. You will work with our research team in our quantum optics laboratory and choose an area (and any combination) among: programming, image processing, telescope construction, optical measurements.

The aim of this project is to validate a new imaging technique that can acquire 3D images with mm precision over long distances (see figure 1a) in a wavelength range where transmission and scattering allow for unprecedented measurements. At the heart of the system is a superconducting nanowire single photon detector (SNSPD), see figures 1b and 1c, developed in our laboratory that enables measurements from the visible range all the way to the mid-infrared with timing resolution in the picosecond.

You will acquire 3D images and will develop new experiments to push further the system's limits.



**Fig.1. a) Working principle of a lidar system that is based on scanning space with laser pulses and measuring photons that interact with the target using a photodetector. b) SNSPD c) SNSPD nanostructure for sensing individual photons (image taken by scanning electron microscope).**