

## Master Thesis:

# Optical packaging of superconducting nanowire single-photon detectors (SNSPDs) with photonic wire bonds (PWB)

**Arrays of Single-Photon Detectors (SPD)** are required for many applications, including quantum information, laser communication and ranging, spectroscopy, etc. **Superconducting nanowire SPDs (SNSPD)** outperform semiconductor-based SPDs in many metrics, but efficient optical coupling to the SNSPDs is challenging.

**Photonic wire bond (PWB)** is a 3D freeform optical waveguide fabricated by multi-photon lithography. It enables efficient optical coupling while avoiding the need for active alignment [1]. In addition, our experiment [2] has demonstrated the stability of PWBs under cryogenic temperatures, which makes them a promising candidate for efficient optical packaging from fiber to SNSPDs.

### Your tasks may include:

- Fabrication of SNSPDs
- Chip assembly
- Fabrication of PWB using multi-photon lithography
- Participation in characterization experiments
- Evaluate the PWB coupled device under cryogenic temperature

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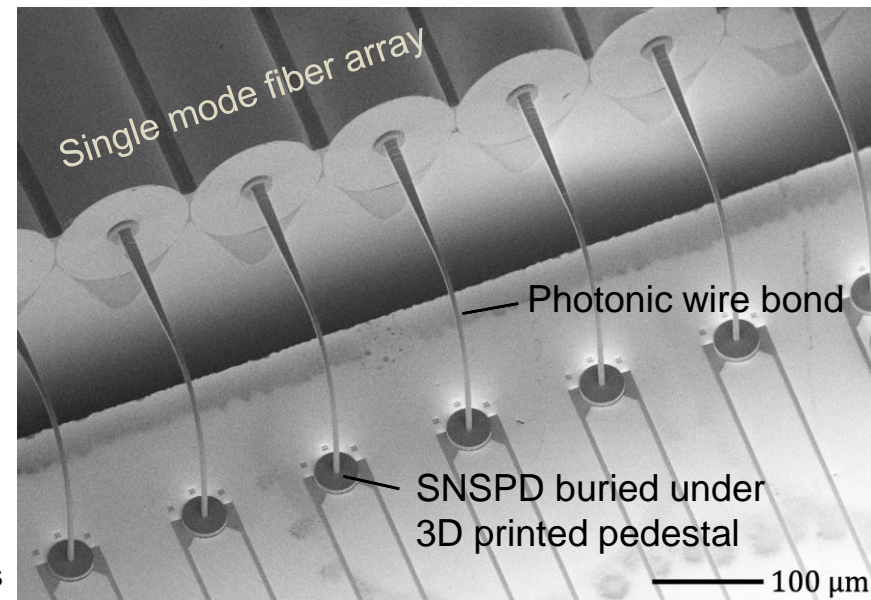
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[1] M. R. Billah, et al. *Optica*, 5(7), 876-883, 2018

[2] Knehr, E; Xu, Y, *et al.* EUCAS 2021