Contribution ID: **82** Type: **Oral Presentation**

Scaled Superconducting Nanowire Detectors in Photonic Circuits

Sunday, 9 December 2018 13:30 (30 minutes)

I will report on our recent progresses on developing scaled superconducting single photon detectors embedded in integrated photonic circuits. Yale's waveguide SSPD design utilizes the concept of evanescent complete absorption of light by a nanowire fabricated atop a waveguide (Fig.1). It overcomes the tradeoff between detection efficiency and speed in conventional meander SSPD designs [1,2]. These traveling wave micro-SSPDs can absorb 99% of the incoming light within 10□m-long optical waveguide and have an order of magnitude less kinetic inductance than conventional meander wire detectors. Therefore, they simultaneously achieve high detection efficiency and high speed, and exhibit excellent detection performance: on-chip quantum efficiency, timing jitter, dark count, intrinsic bandwidth and high scalability.

Our circuit-detector approach is fully compatible with scalable, high-yield semiconductor microfabrication processes. We further show that a large grid of individually addressable micro-SSPD can be fully integrated on a single chip, with each detector element integrated into independent waveguide circuit with custom functionality.[3,4] Such a detector array can be utilized for demonstrating quantum interference of single photons on a silicon photonic chip.[5] Further exploitation of the hybrid photonic and superconducting detector circuits also lead to the realization of on-chip single photon spectrometer with high channel capacity.

Primary author: Prof. TANG, Hong (Yale University)

Presenter: Prof. TANG, Hong (Yale University)

Session Classification: Parallel Session: Photodetectors

Track Classification: Photodetectors