

MajuLab Seminar



Wednesday, March 2, 2022

4:30 PM Singapore time / 09:30 AM French time

Online via Zoom, registration is required. Please register at:

<https://nus-sg.zoom.us/j/911111111111>

Steven Touzard

Department of Materials Science and Engineering, NUS, Singapore



Steven earned his bachelor from Ecole Normale Supérieure de Paris-Saclay and his PhD from Yale University from the group of Michel Devoret. His work focused on stabilizing bosonic codes in superconducting circuits. He then worked as a post-doc at the National University of Singapore on quantum information processing with neutral Strontium atoms. Steven also worked as a consultant for quantum computing companies Alice&Bob and Xanadu. In 2021, Steven was awarded the National Research Foundation Fellowship (Class of 2022) to start a new research initiative in Singapore focusing on building quantum networks of superconducting circuits. He was appointed as a Presidential Young Professor in the departments of Material Science and Engineering as well as the department of Physics of NUS.

Building quantum networks of superconducting circuits mediated by telecom photons

Quantum networks consist of several nodes of quantum processors that can communicate over long-distances, for example through commercial telecom fibers. Superconducting circuits are one of the most advanced technologies to construct the quantum processors at the nodes. However, these processors operate at microwave frequencies and cannot directly make use of the existing telecommunication infrastructure to be linked to one another. The only piece still missing for quantum networks to become a reality is a device that entangles superconducting circuits with travelling telecom photons.

In this talk, I will first review the working principles of superconducting circuits as well as recent progress towards making practical quantum processors. I will then show how my simultaneous expertise in solid-state physics, atomic physics, and quantum control led to a practical design for this desired device. I will explore the challenges of fabricating such a device, as well as state-of-the-art techniques to overcome them.

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