

Save the date

August 18. 14:00-15:00 CEST seminar
15:00-16:00 CEST reception

Hybrid

IN PERSON

The New Niels Bohr Building
Jagtvej 132, 2200 KBH N

ONLINE

LINK UPON REGISTRATION



Quantum Computation using Majorana-Based Topological Qubits

Abstract:

Research in quantum computing has provided numerous new physical insights and the potential to exponentially increase computational power for solving significant problems in science and technology. The primary obstacle to building a scalable quantum computer is errors caused by decoherence. Topological quantum computing addresses this challenge by utilizing topological materials that inherently limit errors.

In this talk, I will discuss the engineering of topological superconductors that support Majorana zero-energy modes at the interface between a conventional superconductor (Aluminum) and a semiconductor with spin-orbit interaction (Indium Arsenide). I will present recent findings from the Microsoft Quantum team that indicate the emergence of topological superconductivity in proximitized semiconductor nanowires. Additionally, I will cover recent measurements of fermion parity, which represent a step towards the fusion of Majorana zero modes. Finally, I will outline a proposal for scalable quantum computing that involves topological qubits composed of superconducting islands in a Coulomb blockade regime, hosting aggregates of four or more Majorana zero modes.

Bio:

Roman Lutchyn is a distinguished physicist and Partner Research Manager at Microsoft, where he leads the quantum hardware design team within the Microsoft Quantum program. His journey in the field of quantum physics began with his graduate studies at the Theoretical Physics Institute, University of Minnesota, where he earned his PhD. His doctoral research focused on the decoherence of superconducting quantum bits, a critical area in the development of quantum computing.



Roman Lutchyn

Title: Physicist and Partner Research Manager at Microsoft. Leads the quantum hardware design team within the Microsoft Quantum program.

Presented in cooperation with:

