

Abstract Submitted  
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**Quantum information transfer between topological and spin qubit systems** MARTIN LEIJNSE, KARSTEN FLENSBERG, Niels Bohr Institute and Nano-Science Center, University of Copenhagen — In this talk I will introduce a method to coherently transfer quantum information, and to create entanglement, between topological qubits and conventional spin qubits. The transfer method uses gated control to transfer an electron (spin qubit) between a quantum dot and edge Majorana modes in adjacent topological superconductors. Because of the spin polarization of the Majorana modes, the electron transfer translates spin superposition states into superposition states of the Majorana system, and vice versa. Furthermore, I will discuss how a topological superconductor can be used to facilitate long-distance quantum information transfer and entanglement between spatially separated spin qubits.

References:

M. Leijnse, K. Flensberg, PRB 84, 140501(R) (2011)

M. Leijnse, K. Flensberg, PRL, in print, arXiv:1107.5703

Martin Leijnse  
Niels Bohr Institute and Nano-Science Center, University of Copenhagen

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