

**Title:** Topological Superconductivity and Majorana Zero Modes

**Sangjun Jeon** (Chung-Ang University)

**Abstract:**

Localized Majorana zero modes (MZMs) are non-Abelian quasiparticles that emerge at the ends of one-dimensional topological superconductors which are promised to be a building block of a fault-tolerant quantum computation. To date, a variety of condensed matter systems is proposed and studied to engineer topological superconductivity and MZMs. This talk will introduce the concepts of topological superconductor and MZMs, and how to use MZMs as a fault-tolerant quantum computation. More specifically, I will review the recent experimental and theoretical progresses in the study of MZMs in the magnetic chain platform and discuss how to engineer a new platform to host MZMs.

**References:**

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2. Sangjun Jeon, Yonglong Xie, Jian Li, Zizun Wang, B. Andrei Bernevig, Ali Yazdani, "Distinguishing a Majorana zero mode using spin-resolved measurements", *Science* **358**, 772 (2017)
3. Jian Li, Sangjun Jeon, Yonglong Xie, Ali Yazdani, and B. Andrei Bernevig, "The Majorana Spin in Magnetic Atomic Chain Systems", *Physical Review B* 97, 125119 (2018)