

# **Symmetry Protected Majorana Fermions in Topological Superconductors**

**Masatoshi Sato\***

**Department of Applied Physics, Graduate School, School of Engineering, Nagoya University, Japan**

**\*Email of Presenting Author: msato@nuap.nagoya-u.ac.jp**

## Abstract

Recently, there are considerable interests in Majorana fermions in topological superconductors.

Now we have realized that one of promising schemes to realize Majorana fermions is to break some of symmetries of the system. Indeed, by inducing the spin-orbit interaction and the Zeeman coupling which break inversion and time-reversal symmetries respectively, conventional s-wave superconductors may support Majorana fermions on the boundaries. Moreover, by breaking the spin-rotation symmetry, spin-triplet superconductors may support Majorana fermions. Therefore, one might say that symmetry is an obstruction to realize Majorana fermions.

In this talk, however, I will discuss a positive role of symmetry in Majorana fermions.

We show that symmetry may protect Majorana fermions in topological superconductors. As an example, we will show that Majorana Ising character, which gives a detectable signal of Majorana fermion, is stabilized by symmetry of the system.

## About the speaker