

Topological Superconductors and Superfluids

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Triggered by the recent predictions and subsequent experimental confirmation of “topological insulators”, topological classification of materials provides new insights into investigations of novel “topological quantum phenomena” in superconductors and superfluids. We will first review topological classification of materials and the associated topological edge states. We then focus on the topological quantum phenomena in Sr_2RuO_4 , a leading candidate of the “ $p+ip$ ” topological superconductor belonging to the same topological class as the superfluid $^3\text{He-A}$ confined in a slab geometry.¹ Next we introduce key concepts in topological quantum phenomena, such as Majorana quasiparticles, odd-frequency Cooper pairing, and topological quantum phase transitions.

1. Maeno, Y., Kittaka, S., Nomura, T., Yonezawa, S., Ishida, K., J. Phys. Soc. Jpn. **81**, 011009 (2012).

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