

MAR13-2012-020117

Abstract for an Invited Paper
for the MAR13 Meeting of
the American Physical Society

Search for Topological Superconductivity in Superconducting Doped Topological Insulators¹

SATOSHI SASAKI, Institute of Science and Industrial Research, Osaka University

Recent discovery of topological insulators (TIs) which can be characterized by topologically protected gapless surface states stimulated the search for an even more exotic state of matter, a topological superconductor (TSC), which is also predicted to have a topologically protected gapless surface state consisting of massless Majorana fermions as its distinctive characteristic. Low-carrier-density semiconductors with a strong spin-orbit coupling and a Fermi surface that is centered around time-reversal-invariant momenta, such as superconducting doped TIs, are predicted to be prime candidates for TSCs [1]. Following this prediction, we studied the nature of superconductivity in doped TIs, $\text{Cu}_x\text{Bi}_2\text{Se}_3$ and $\text{Sn}_{1-x}\text{In}_x\text{Te}$, by employing a conductance spectroscopy [2, 3]. I will present our latest results together with recent spectroscopy data from other groups, and summarize the current understanding of topological superconductivity in superconducting doped TIs. Work in collaboration with M. Kriener, Z. Ren, A. A. Taskin, K. Segawa, Y. Ando (Osaka Univ.), K. Yada, M. Sato, Y. Tanaka (Nagoya), and L. Fu (MIT).

[1] L. Fu and E. Berg, Phys. Rev. Lett. **105**, 097001 (2010).

[2] S. Sasaki, M. Kriener, K. Segawa, K. Yada, Y. Tanaka, M. Sato, and Y. Ando Phys. Rev. Lett. **107**, 217001 (2011).

[3] S. Sasaki, Z. Ren, A. A. Taskin, K. Segawa, L. Fu, and Y. Ando, arXiv:1208.0059 (2012).

¹Supported by JSPS (KAKENHI 24740237 and NEXT Program) and AFOSR (AOARD 124038)