第９回トポロジカル物質科学セミナー
Topological Material Science Seminar (9)

Superconductivity with massive Dirac particles: Theoretical analysis for a candidate of the topological superconductor $Cu_xBi_2Se_3$

Dr. Yuki Nagai

CCSE, Japan Atomic Energy Agency

Place: Room K202, Seminar Room K202, Main Building, Yukawa Institute, Kyoto Univ.
Date: April 22 (Friday), 2016
Time: 14:00pm-

Abstract:

Topological materials, such as topological insulators and superconductors open an intriguing avenue of materials science and quantum engineering. Both surface and bulk probes are crucial for identifying topological materials. The bulk-boundary correspondence indicates that gapless surface states between different topological states signal nontrivial topological order. On the other hand, in so-called unconventional superconductors such as d-wave or p-wave superconductors, it is well known that the gapless surface states appear. Thus, we have investigated topological superconductors as unconventional superconductors. In this talk, we focus on a candidate of a topological superconductor CuxBi2Se3. This material can be regarded as a superconductor with relativistic particles, since the topological insulator Bi2Se3, which is the parent compound, is described by the massive Dirac Hamiltonian. In addition, we can access the ultrarelativistic and non-relativistic limits, since the doping controls a relativisity.

In this talk, I will show various kinds of properties of the superconductivity with relativistic particles. I will also show our recent study “Inverse coherence effects in nuclear magnetic relaxation rates as a sign of topological superconductivity”, in which we propose a bulk quantity to detect a topological property.

Host: M. Sato [Kyoto Univ. / Core Research Group D01]
（075-753-7044, msato@yukawa.kyoto-u.ac.jp）