Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Theory of surface Andreev bound states and tunneling spectroscopy in three-dimensional chiral superconductors[1] SHUN TAMURA, SHINGO KOBAYASHI, Department of Applied Physics, Nagoya University, LU BO, National Graphene Institute, University of Manchester, Manchester, YUKIO TANAKA, Department of Applied Physics, Nagoya University — We study the surface Andreev bound states (SABSs) and quasiparticle tunneling spectroscopy of three-dimensional (3D) chiral superconductor by changing the surface (interface) misorientation angle of chiral superconductors. We obtain analytical formula of the energy dispersion of SABS for general pair potential when an original 4×4 BdG Hamiltonian can be reduced to be two 2×2 blocks. The resulting SABS for 3D chiral superconductors with pair potential given by $k_z(k_x + ik_y)^\nu$ ($\nu = 1, 2$) has a complicated energy dispersion due to the coexistence of both point and line nodes. We focus on the tunneling spectroscopy of this pairing in the presence of applied magnetic field which induces Doppler shift of quasiparticle spectra. By contrast to previous known Doppler effect in unconventional superconductors, zero bias conductance dip can change into zero bias conductance peak by external magnetic field. We also study SABSs and tunneling spectroscopy for possible pairing symmetries of UPt_3. For this purpose, we extend a standard formula of tunneling conductance of unconventional superconductor junctions. The tunneling spectroscopy in the presence of magnetic field can serve as a guide to determine the pairing symmetry of this material.

[1]Scientific Research on Innovative Areas Topological Material Science JPSJ KAKENHI

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Date submitted: 11 Nov 2016 Electronic form version 1.4