IBS CINAP Seminar

April 16, 2019, 11:00AM

Room 86120 (N Center), Sungkyunkwan University, Suwon

Engineering Majorana quasi-particle

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Abstract

Ferromagnetic chains of Fe atoms on a superconducting Pb substrate have proven to be a platform to host Majorana zero modes(MZM). By combining ferromagnetism, strong Rashba spin-orbit coupling and superconductivity, engineering a new platform is highly desirable to further study the emergence of MZMs and to find systems with the largest topological gap. We have successfully grown epitaxial bismuth thin film on a superconducting substrate that shows robust proximity induced superconductivity with a hard gap. We've characterized the electronic structure of bismuth films and examined the proximitized superconductivity. To realize MZM, we carried out experiments of Fe cluster decorated quantum spin Hall edge states on a proximitized Bi(111) thin film. Using high-resolution STM spectroscopy, we observed distinct localized zero-bias peaks at the interface of the experimental system.

Brief Bio

Dr. Sangjun Jeon received his PhD in August 2012 from Seoul National University where he studied the proximity effect and quantum oscillation of low dimensional superconductivity using a scanning tunneling microscopy (STM). He worked as a Postdoctoral research and research staff in the physics department of Princeton University where he studied electronic properties of topological materials and spin properties of one-dimensional topological superconductivity. Dr. Jeon is an assistant professor in Physics department of Chung-Ang University since September 2018. His current research interest is engineering an unconventional superconductivity using hetero-structured thin film made of Rashba metal and a superconductor for detecting unusual electronic and spin properties of the superconductor.

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