Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Internal Webinar

Electrical transport characteristics of superconducting point contacts

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Mesoscopic junctions between normal metals and superconductors are often used as a tool for extracting energy, momentum, and spin-resolved spectroscopic information about the Fermi surface of metals and the amplitude and symmetry of the superconducting energy gap of superconductors. We have used the home-built PCS probe to study the superconducting properties of Sr-intercalated Bi_2Se_3, a candidate topological superconductor. We have shown that the high-pressure superconducting phase of Sr-Bi_2Se_3 can be realized under a mesoscopic point contact, where transport spectroscopy can be used to probe the nature of superconductivity. Based on the possible source of the error in the interpretation of spectroscopic results of amesoscopic transport, we have theoretically modelled a point contact as an ensemble of a micro-constrictions through which electronic transport takes place. We precisely present the simple and general explanation that is valid for transport through all kinds of superconducting junctions including conventional and unconventional superconductors.

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