

Superconducting Proximity Effect And Conductance Anomalies in Sn-Bi₂Se₃ Junctions

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We have investigated the conductance spectra of Sn-Bi₂Se₃ single junction device down to 250 mK and in different magnetic fields. A double-gap structure was observed at the center of the conductance spectra. With the sharpening of the small gap at lower temperatures, a zero-bias conductance peak occurred. This phenomena would reflect the formation of a proximity effect induced new superconducting state at the interface. The new state was found to be competing with the s-wave superconductivity in Sn electrodes, demonstrating presumably an unconventional pairing symmetry. A broad region with enhanced conductance was also observed below T_c , which extends well beyond the superconducting gap of Sn. So far, the origin of this structure is not clear.