

Colloquium Notice

Javad Shabani

New York University

Probing Andreev Bound States in Superconductor-semiconductor Josephson Junctions

It is realized that by interfacing BCS superconductors and semiconductors with strong spin-orbit coupling it is possible to create a system that can host exotic states of matter. Hence epitaxial superconductors and semiconductors have emerged as an attractive materials system with atomically sharp interfaces and broad flexibility in device fabrications incorporating Josephson junctions. We place our Al-InAs Josephson junction into circuit quantum electrodynamics to directly probe the Andreev bound states. We probe the microwave photons from a superconducting resonator that are coupled to the junction. These measurements reveal a coupling interaction between the resonator and the Andreev bound states, enabling the mapping of isolated individual Andreev bound states characterized by near-unity transparency and a substantial induced superconducting gap. Exploration of the gate parameter space illustrates the evolution of Andreev bound states with gate voltage, revealing the mapping of multiple Andreev bound states.

Monday

November 4, 2024

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326

This talk is accessible via [Zoom](#) or use

meeting ID 829 2687 2594 and **passcode 866995** to join