

Subject: MS Colloquium-1-/20-Galperin-Bldg. 212/A-157
From: Nancy Sanchez <sanchez@anl.gov>
Date: Mon, 26 Sep 2005 08:29:06 -0500
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MATERIALS SCIENCE COLLOQUIUM

SPEAKER: Professor Yuri Galperin
Argonne National Laboratory & University of Oslo, Norway

TITLE: Tunneling between a superconductor and a hopping insulator

DATE: Thursday, October 20, 2005

TIME: 11:00 a.m.

PLACE: Building 212, Room A157

HOST: Maria Iavarone

Refreshments will be served at 10:45 a.m.

Abstract: We develop a theory of low-temperature charge transfer between a superconductor and a hopping insulator. The main result is that the charge transfer can be governed by the coherent two-electron -- Cooper pair conversion process, time reversal reflection, where electrons tunnel into superconductor from the localized states in the hopping insulator located near the interface. This process is an analog to conventional Andreev reflection process.

We calculate the time reversal interface resistance and show that it is accessible experimentally. Since there exists a non-trivial interplay between the suggested processes and hopping through the percolation cluster in the bulk, the time reversal interface resistance provides interesting information on both interface and bulk charge transfer. In mesoscopic structures it can exceed the bulk hopping resistance.