



PHYSICS AND ASTRONOMY COLLOQUIUM

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“Strands of Superconductivity at the Nanoscale”

Abstract

Superconducting circuitry can now be fabricated at the nanoscale, e.g., by depositing suitable materials on to single molecules, such as DNA or carbon nanotubes. I shall discuss various themes that arise when superconductivity is explored in this new regime, including the thermal passage over and quantum tunneling through barriers by the superconducting condensate as a whole, as well as a strange, hormetic effect that magnetism can have on nanoscale superconductors. I shall describe nanoscale superconducting quantum interference devices, which are subtly sensitive to magnetic fields and patterns of supercurrent--features that hint at uses of superconducting nanocircuitry, e.g., in mapping quantum phase fields and testing for superconducting correlations in novel materials. I shall also mention settings in which superconducting nanosamples show a particular sensitivity to their geometry or topology, and shall conclude by touching on two emerging themes: the interplay between graphene and superconductivity, and what nanoprobe might be revealing about exotic forms of superconductivity.

Wednesday, November 13, 2013

3:30 p.m.

Bob Wright Centre

Room A104