

Stanford University School of Humanities and Sciences

## Department of Applied Physics

### Malcolm R. Beasley

*Professor of Applied Physics, Emeritus*

[Directory Link](#)



Research areas:  
Condensed Matter

### Description

#### Condensed Matter Physics

Recent studies have indicated that no known superconductor is able to meet the needs of electric power applications above liquid nitrogen temperature and therefore a new high temperature superconductor is required. Along with three other universities, we have initiated a program to search for high temperature superconductors based on electronic (spin and charge) mechanisms of superconductivity, and their related physics.

#### Nanoscience and Quantum Engineering

The study of quantum transport in natural (single molecules and nanotubes) and synthetic (lithographic) nano-structures is a well established field. By comparison, the study of local quantum transport in macroscopic systems is largely uncharted territory, due principally to the lack of a suitable instrument to study such processes. We have developed practical scanning tunneling potentiometer that is well suited to this task and are not applying it to the study of quantum transport in a variety of materials.

### Selected Publications

Use of real-time Fourier transform infrared reflectivity as an in situ monitor of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> film deposition and processing  
Giant proximity effect in cuprate Superconductors  
Cryogenic scanning Hall-probe microscope with centimeter scan range and submicron resolution  
Imaging ac losses in superconducting films via scanning Hall probe microscopy  
Origin of charge density at LaAlO<sub>3</sub> on SrTiO<sub>3</sub> heterointerfaces: possibility of intrinsic doping  
Design and performance of a practical variable-temperature scanning tunneling potentiometry system  
Anomalous double peak structure in superconductor/ferromagnet tunneling density of states  
Tetragonal CuO: end member of the 3d transition metal monoxides

### More Faculty in This Theme



Benjamin Lev



David A. Reis



Daniel S. Fisher



Ian R. Fisher



Harold Y. Hwang



Aharon Kapitulnik