
Physics Colloquium

University of Missouri-Kansas City

Department of Physics

Siyuan Han

*Department of Physics and Astronomy,
University of Kansas, Lawrence*

Quantum Mechanics of Electrical Circuits and Their Applications

For much of the history of the quantum mechanics (QM) the question of whether macroscopic objects obey the laws of QM, exemplified by the famous Schrodinger's Cat paradox, is more philosophical musings than experimentally testable physics. However, this situation changed dramatically in the early 1980's when Leggett and collaborators suggested that it was possible to put the question into experimental test using electrical circuits based on Josephson junctions and SQUIDs (Superconducting Quantum Interference Devices). In my talk I will give a brief review on the progress made in the past 25 years on our understanding of this fascinating subject. I will show that under appropriate conditions electrical circuits indeed behave quantum mechanically and that realizing the electrical version of the Schrodinger's Cat has become a routine process in labs around the world. I will then show that, through the example of macroscopic resonant tunneling, what we can learn about the nature of magnetic flux noise which has become one of the most difficult hurdles to overcome on our road to the realization of scalable quantum computation.

February 20, 2009

Physics Department
Robert H. Flarsheim Science & Technology Hall
5110 Rockhill Road
University of Missouri-Kansas City

****Coffee at 3:10: Colloquium at 3:30 in Room 310****