

Chez Pierre

Presents ...

Monday, March 30, 2009

12:00pm

MIT Room 4-331



“Special Chez Pierre Seminar”

Celebration of the 2009 Oliver Buckley Prize

to

MIT Physicists

Bob Meservey, Paul Tedrow & Jagadeesh Moodera

Dr. Jagadeesh Moodera

Massachusetts Institute of Technology

“Spin Polarized Tunneling and Tunnel Magnetoresistance”

Electron tunneling phenomenon has enriched our understanding of various branches of physics over the years. Spin polarized tunneling (SPT), sensing of the spin polarization of tunneling electrons using a spin split superconducting spin detector, discovered by Meservey and Tedrow at FBML in the early seventies has been successfully utilized over the years to understand many aspects of magnetism and superconductivity. In this overview talk we will cover the field from the discovery of this phenomena that eventually led to the observation of room temperature tunnel magnetoresistance (TMR) effect, to spin filtering, to the toggling of the superconducting state with spin current and spin tunneling in organic semiconductors. We will highlight the work done at FBML over the years until now. Electrical spin injection/detection in a semiconductor, currently the hot area, is strongly believed to succeed through such an approach. The successful observation of a large change in tunnel current in magnetic tunnel junctions (MTJ) in the mid nineties has brought extreme activity in this field – from the point fundamental study to extensive application in mind (as sensors, nonvolatile memory devices, logic elements etc).

Work done in collaboration with Drs. Meservey and Tedrow, PhD students, postdoctorals, as well as high school students and undergraduates. NSF, ONR, DARPA and KIST-MIT project funds supported the research over the years.