Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Results of Resonant Activation and Macroscopic Quantum Tunneling Experiments in Magnesium Diboride Thin Film Josephson Junctions[1] ROBERTO RAMOS, Indiana Wesleyan University, STEVE CARABELLO, JOSEPH LAMBERT, JEROME MLACK, Drexel University, WENQING DAI, YI. SHEN, QI LI, The Pennsylvania State University, DANIEL CUNNANE, C.G. ZHUANG, KE CHEN, X.X. XI, Temple University — The Josephson junction is an experimental testbed widely used to study resonant activation and macroscopic quantum tunneling. These phenomena have been observed in junctions based on conventional low-temperature superconductors such as Nb and Al, and even in high-T_c, intrinsic superconductors. We report results of superconducting-to normal state switching experiments below 1 K using MgB_2-based Josephson heterojunctions with Pb and Nb counter-electrodes. Measurements were made with and without RF excitation. With microwaves, we see evidence of a resonant peak, in addition to the primary escape (from ground state) peak – consistent with resonant activation. We also observe features suggestive of macroscopic quantum tunneling including peaks in the escape rate enhancements and an "elbow" in the graph of calculated escape temperatures T_{esc} versus sample temperature.

[1]This research has been supported by a grant-in-aid from Sigma Xi.

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Date submitted: 08 Dec 2011 Electronic form version 1.4