

Abstract Submitted
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”Hybrid” multi-gap/single-gap Josephson junctions: Evidence of macroscopic quantum tunneling in superconducting-to-normal switching experiments on MgB₂/I/Pb and MgB₂/I/Sn junctions STEVE CARABELLO, JOSEPH LAMBERT, Drexel University, WENQING DAI, QI LI, Penn State University, KE CHEN, DANIEL CUNNANE, X. X. XI, Temple University, ROBERTO RAMOS, University of the Sciences — We report results of superconducting-to-normal switching experiments on MgB₂/I/Pb and MgB₂/I/Sn junctions, with and without microwaves. These results suggest that the switching behavior is dominated by quantum tunneling through the washboard potential barrier, rather than thermal excitations or electronic noise. Evidence includes a leveling in the standard deviation of the switching current distribution below a crossover temperature, a Lorentzian shape of the escape rate enhancement peak upon excitation by microwaves, and a narrowing in the histogram of escape counts in the presence of resonant microwave excitation relative to that in the absence of microwaves. These are the first such results reported in “hybrid” Josephson tunnel junctions, consisting of multi-gap and single-gap superconducting electrodes.

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