

Abstract Submitted
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Tunneling through the metal-insulator transition with Nb/Nb_xSi_{1-x}/Nb Josephson junctions BURM BAEK, National Institute of Standards and Technology, ALAN KLEINSASSER, GEORGE KERBER, Jet Propulsion Laboratory, PAUL DRESSELHAUS, SAMUEL BENZ, National Institute of Standards and Technology, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM, JET PROPULSION LABORATORY COLLABORATION — We have successfully fabricated Josephson junctions with Nb_xSi_{1-x} barriers to study the metal-insulator transition. By tuning the relative concentration of the barrier we can explore the electrical properties as different junctions are controllably tuned to concentrations in either the metallic or insulating states.. By cosputtering Nb and Si, reliable control of barrier properties has been achieved. In the metallic barrier regime that has higher Nb content, the uniformity, reproducibility, and tunability have already proven useful for voltage standard applications. In the insulating regime that has low Nb concentration, we observe hysteretic junction behavior. Details of the crossover from metallic to insulating behavior of the Josephson barrier will be discussed along with the ramifications for superconductive devices using this technology.

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