

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Experimental Study of Transport through Few-nm Metal Oxide Tunnel Barriers

By

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We have studied resistive bistability (memory) effects in junctions based metal oxides, with a focus on sample-to-sample reproducibility which is necessary for the use of such junctions as crosspoint devices of hybrid CMOS/nanoelectronic circuits. Few-nm-thick layers of NbO_x , CuO_x and TiO_x have been formed by thermal and plasma oxidation, at various deposition and oxidation conditions, both with or without rapid thermal post-annealing (RTA). The resistive bistability effect has been observed for all these materials, with particularly high endurance (over 10^3 switching cycles) obtained for single-layer TiO_2 junctions, and best reproducibility, for multilayer junctions of the same material. Fabrication optimization has allowed us to improve the ON/OFF conductance ratio to about 10^3 , but the sample-to-sample reproducibility is so far lower than that required for large scale integration.

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Place: Physics Building, Room B131

Program: Physics

Dissertation Advisor: Konstantin Likharev