

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Transport Characteristics of co-Deposited Alumina Barriers in Nb-AlO<sub>x</sub>-Nb Josephson Junctions**<sup>1</sup> ALLISON F. DOVE, University of Illinois at Urbana-Champaign, GUSTAF A. OLSON, BRIAN ENDERS, CHRIS D. NUGROHO, VLADIMIR ORLYANCHIK, DALE J. VAN HARLINGEN, JAMES N. ECKSTEIN — A major contributor to dephasing in superconducting qubits are dynamical charge defects. A likely source of charge defects in these qubits are oxygen deficiencies in the insulating barrier of the Josephson junctions that modulate their critical current. When such barriers are grown by diffusion of oxygen, it is thought that there are more oxygen deficiencies than when the barriers are grown by co-deposition of metal and oxygen. We use molecular beam epitaxy and an oxygen source to grow alumina barriers in niobium-alumina-niobium sandwich-style Josephson junctions. Because transport characteristics serve as a good initial measure of the insulating barrier quality, we report transport characteristics of devices with various barrier properties. The low-frequency noise properties of these junctions will also be measured and correlated with junction parameters.

<sup>1</sup>Work supported by IARPA grant Army UCB-00006692. This work was carried out at the F. Seitz Materials Research Laboratory at the University of Illinois, which is partially supported by the DOE under grants DE-FG02-07ER46453 and DE-FG02-07ER46471.

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Date submitted: 19 Nov 2009

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