Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Growth of epitaxial superconductor/dielectric heterostructures using a sputtering PLD hybrid system with in-situ RHEED KWANG HWAN CHO, JACOB PODKAMINER, CHAD FOLKMAN, CHANG-BEOM EOM, Department of Materials Science and Engineering, University of Wisconsin-Madison — One of limiting factors in superconducting qubits is decoherence caused by microscopic defects in dielectric layer such as nanocrystalline regions and grain boundaries in a shunted capacitor. We have grown epitaxial Re thin films on a c-plane sapphire substrate using RF magnetron sputtering, then transferred *ex-situ* to a pulsed laser deposition (PLD) system where dielectrics thin film layer is deposited. One drawback of this fabrication approach is the necessity to expose the sample to air when the sample is transferred to different deposition chambers. In order to avoid these drawbacks, we have employed a hybrid PLD-sputtering deposition that will allow us to grow the oxide dielectric/Re heterostructures in an *in-situ* environment without breaking vacuum. The system is also equipped with a reflection high energy electron diffraction (RHEED) which will allow us to perform *in-situ* characterization of the structure and growth dynamics. We will discuss our strategy of epitaxial growth of various single crystal dielectrics on superconducting thin films in this system and their structural and electrical properties of the heterostructures

Kwang Hwan Cho
Department of Materials Science and Engineering,
University of Wisconsin-Madison

Date submitted: 21 Nov 2010 Electronic form version 1.4