

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Conductivity anisotropy in strained VO₂ thin films, probed by THz Time Domain Spectroscopy¹ MENGKUN LIU, mengkun@buphy.bu.edu, ELSA ABREU, JIWEI LU, KEVIN WEST, SALINPORT KITTIWATANAKUL, WENJING YIN, STUART WOLF, RICHARD AVERITT, 1DEPARTMENT OF PHYSICS, BOSTON UNIVERSITY, BOSTON MA COLLABORATION, DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING, UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE VA COLLABORATION, DEPARTMENT OF PHYSICS, UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE VA COLLABORATION — We used THz time domain spectroscopy to measure the temperature and polarization dependent far-infrared conductivity of high quality strained VO₂ thin films epitaxially grown on (100) TiO₂ substrates. A large conductivity anisotropy is observed in the metallic phase of our VO₂ films with the conductivity along the rutile axis ~ 30 times larger than the orthogonal direction. The MIT temperature also exhibits anisotropy with a value of 360K along the rutile c axis and 340K along the perpendicular direction. Our results are consistent with substrate induced strain modulation of the energy and bandwidth associated with the vanadium 3d orbitals.

¹We would like to acknowledge support from DOE-BES for this work under grant DE-FG02-09ER46643, DE-FG02-00ER45799, and ETRI.

Mengkun Liu
mengkun@buphy.bu.edu

Date submitted: 18 Nov 2010

Electronic form version 1.4