Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Bi-chromatic probing of the metal-insulator transition in VO2 thin film LEI WANG, IRINA NOVIKOVA, The College of William and Mary, Physics Department, MICHAEL KLOPF, FEL-T. Jefferson National Accelerator Facility, ERIC MADARAS, NASA Langley Research Center, SCOTT MADARAS, GWYN WILLIAMS, FEL-T. Jefferson National Accelerator Facility, ROSA LUKASZEW, The College of William and Mary, Physics Department — VO2 is a correlated electron material that exhibits a metal-insulator (MIT) phase transition that can be thermally, electrically, or optically controlled. For the thermally-induced case the material undergoes a structural transition from a monoclinic insulating state to rutile metal at around 340K. The salient features of this first order phase transition are that upon the transition the material exhibits up to five orders-of-magnitude increase in conductivity and consequently also significant changes in the optical properties. Typically in these oxides, competing states can often coexist and form nano- or microscale domains of different phases while transitioning. Here we show that upon thermally inducing the MIT on epitaxial VO2 films when simultaneously probed by two very different frequencies- namely IR and THz- the onset of the MIT appears at somewhat different temperature depending on the light used to probe it, thus confirming the coexistence of nano-scale domains of different phases. We will show our correlated far field optical and transport studies on these films to investigate the percolative nature of the transition and applied mean field approximations to model the observed response.

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Date submitted: 20 Nov 2012 Electronic form version 1.4