

Abstract Submitted  
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**Ultrafast Pump Probe Transmission Spectroscopy of VO<sub>2</sub>** NATHANIEL BRADY, University of Alabama at Birmingham, KANNATASSEN APPAVOO, Vanderbilt University, MINAH SEO, PRASHANTH UPADHYA, Los Alamos National Laboratory, JOYEETA NAG, RICHARD HAGLUND, Vanderbilt University, ROHIT PRASANKUMAR, Los Alamos National Laboratory, DAVID HILTON, University of Alabama at Birmingham — We have performed nondegenerate pump-probe transmission spectroscopy, pumping with an above the band gap (1.5 eV) 50 fs pulse and probing with a 0.4 eV (below the band gap) pulse to monitor the dynamics of the formation of the metallic phase in vanadium dioxide (VO<sub>2</sub>). Below the percolation threshold (< 330 K), we find an initial drop in transmission consistent with electron-hole generation across the band gap, while in the fully metallic phase (< 365 K), we see an initial rise in transmission due to transient heating of electrons at the Fermi surface. In the transitional region, the data show complex time dependence consistent with the nucleation and growth of metallic domains in the semiconducting phase and ultrafast heating of metallic precursors in the insulating phase.

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