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Disorder-dominated Ultrafast Dynamics in Vanadium Dioxide NATHANIEL BRADY, University of Alabama at Birmingham, KANNATASSEN APPAVOO, Vanderbilt University, ROHIT PRASANKUMAR, Los Alamos National Laboratory, RICHARD HAGLUND, Vanderbilt University, DAVID HILTON, University of Alabama at Birmingham — We have performed nondegenerate ultrafast pump-probe spectroscopy of the insulator-to-metal phase transition in vanadium dioxide (VO_2) on several different samples of varying disorder as functions of temperature and pump fluence. Our results are inconsistent with the commonly used assumption of homogeneous nucleation and growth of metallic islands in the parent semiconducting phase and indicate the strong role of disorder on the ultrafast dynamical response.

Nathaniel Brady
University of Alabama at Birmingham

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