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Effect of strain on the dynamics of optically induced metal-insulator transition of VO_2 thin films ELIZABETH RADUE, MATT SIMONS, LEI WANG, William & Mary Coll, S. KITTIWATANAKUL, J. LU, S.A. WOLF, University of Virginia, R.A. LUKASZEW, IRINA NOVIKOVA, William & Mary Coll — Vanadium Dioxide undergoes a first order metal-insulator transition (MIT) when heated to 340K or when stimulated with a strong optical pulse. There is much interest in Vanadium dioxide due to its convenient transition temperature, and the many potential applications. In addition to the dramatic change in conductivity, the advent of ultrafast lasers has made it possible to induce the MIT in the femtosecond regime. Thin films of VO_2 are able to robustly undergo reversible MITs over many cycles. Changes in the microstructure can be used to tune the MIT. We are studying the dynamics of the phase transition, specifically how different amount of strain can affect both the quick transition to the metallic phase and the slower relaxation back to the insulating phase. We have found noticeable differences in the threshold fluence needed to optically induce the MIT in films on different substrates, as well as the longevity of the metallic state. We will be discussing the implications of these differences regarding the mechanisms responsible for the optically induced phase transition.

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