

Abstract Submitted  
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**Phase transitions in advanced materials responding to ultrafast laser pulses: review of some experiments and a new theoretical approach**

ROSS TAGARAS, ROLAND ALLEN, Texas A&M University — This talk will review some experimental studies of advanced materials responding to fast intense laser pulses, including light-induced superconductivity in cuprates [1]. A new method will be introduced for treating ultrafast phase transitions, such as those involving superconductivity, magnetism, charge density waves, and spin density waves. Illustrative results will be presented for a toy model, with the electronic temperature immediately after the laser pulse calculated as a function of the fluence. We wish to thank Ayman Abdullah-Smoot, Michelle Gohlke, David Lujan, and James Sharp for many helpful discussions and other contributions. [1] D. Fausti, R. I. Tobey, N. Dean, S. Kaiser, A. Dienst, M. C. Hoffmann, S. Pyon, T. Takayama, H. Takagi, and A. Cavalleri, “Light-Induced Superconductivity in a Stripe-Ordered Cuprate”, *Science* 331, 189 (2011).

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