

Abstract Submitted
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Current understanding of the laser-induced ultrafast (de)magnetization process¹ GUOPING ZHANG, MINGQIANG GU, Department of Physics, Indiana State University, M.S. SI, Department of Physics, Lanzhou University, China, T.F. GEORGE, University of Missouri-St. Louis, XIAOSHAN WU, Nanjing University, China — The laser-induced ultrafast (de)magnetization process in ferromagnets is complex. There are several theories available [1], but none of these is satisfactory. In this talk, we first review several theoretical formalism for femtomagnetism and point out strengths and weaknesses of each theory [2]. In particular, we address issues associated with comparing experimental and theoretical results, which have been very challenging. Our first-principles theory includes electron correlation and electron-phonon effects along with spin-orbit coupling in metals or rare-earth compounds. Some of the newest results are presented, which are expected to tremendously enhance our understanding of the overall (de)magnetization process [3].

[1] G. P. Zhang, G. Lefkidis, W. Hübner, and Yihua Bai, J. APPL. PHYS. **111**, 07C508 (2012).

[2] M. S. Si and G. P. Zhang, AIP ADVANCES **2**, 012158 (2012).

[3] G. P. Zhang, PHYSICAL REVIEW B **85**, 224407 (2012).

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