Abstract Submitted
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Spatio-Temporal Control of XUV FID (xFID) Emission in Helium[1] E. R. SIMPSON, S. BENGTSSON, N. IBRAKOVIC, Lund University, S. CAMP, K. J. SCHAFER, M. B. GAARDE, Louisiana State University, L. RIPPE, J. MAURITSSON, Lund University — Precise spatio-temporal control of extreme ultra-violet (XUV) light resulting from free induction decay (FID) has recently been demonstrated through opto-optical modulation in argon [1]. Here we present an extension of this technique, exploring precision control over XUV induced FID (xFID) in helium. By tuning the frequency content of the coherent XUV excitation pulse, we probe the resonant excitation of a number of bound excited states. The directionality of the xFID signal is controlled by a Stark shift-induced phase gradient applied using a non-coaxial, variable delay, IR control pulse. In this way both the spatial and temporal properties of the xFID signal can be controlled through the intensity and delay of the applied control pulse. We observe the direction of the xFID signal from the 2p state to be opposite to that for the higher np manifold, as expected from the direction of the applied Stark shift. In addition the 2p state splits, emitting FID in both directions. This forms an effective beam splitter, opening the door for 'which way' interference. By shaping, or increasing the number of control pulses, possibilities for xFID control could include opto-optical switching and focussing of the xFID emission. [1] S. Bengtsson et al. arXiv:1611.04836v1

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