

Abstract Submitted  
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**Rapid inversion of velocity map images for adaptive femtosecond control**<sup>1</sup> C. RALLIS, P. ANDREWS, R. AVERIN, B. JOCHIM, N. GREGERSON, E. WELLS, Department of Physics, Augustana College, Sioux Falls, SD 57197 USA, M. ZOHRABI, S. DE, B. GAIRE, K.D. CARNES, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, Kansas 66506 USA, B. BERGUES, M.F. KLING, Max Planck Institute of Quantum Optics, Hans-Kopfermann Strasse 1, D-85748 Garching, Germany — We report techniques developed to utilize three dimensional momentum information as feedback in adaptive femtosecond control of molecular systems. Velocity map imaging of the dissociating ions following interaction with an intense ultrafast laser pulse provides raw data. In order to recover momentum information, however, the two-dimensional image must be inverted to reconstruct the three-dimensional photofragment distribution. Using a variation of the onion-peeling technique, we invert 1054 x 1040 pixel images in under 1 second. This rapid inversion allows a slice of the momentum distribution to be used as feedback in a closed-loop adaptive control scheme.

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