Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Signatures of different vibrational modes in strong-field fragmentation of diiodomethane[1] B. KADERIYA, Y. MALAKAR, KANAKA RAJU P., W.L. PEARSON, F. ZIAEE, K. JENSEN, J. RAJPUT, I. BEN-ITZHAK, D. ROLES, A. RUDENKO, J.R. Macdonald Laboratory, Kansas State University, Manhatan, KS 66506 — The diiodomethane molecule (CH_2I_2) has served as a model system for time-domain studies of large-scale bending vibrations and concerted elimination of I_2^+ [1]. Here we present the results of a time-resolved 3D Coulomb explosion imaging experiment on diiodomethane that maps ultrafast dynamics of both, bound and dissociating nuclear wave packets driven by a strong laser field. Measuring yields, kinetic energies and emission angles of coincident ionic fragments as a function of time delay between two 25 fs, 800 nm pump and probe pulses, we track the propagation of different dissociation pathways and visualize vibrational motion of the molecule. Analyzing channel-selective Fourier spectra, we observe signatures of both, bending and stretching vibrations of diiodomethane, and reveal correlation between bending motion (the I-C-I "scissors" mode) and different fragmentation pathways, including I_2^+ elimination. [1] D. Geißler *et al.*, J. Chem. Phys. **127**, 204305 (2007).

[1]Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U. S. DOE. K. R. P. and W. L. P. supported by NSF Award No. IIA-143049, K.J. supported by the NSF-REU grant No. PHYS-1461251.

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Date submitted: 29 Jan 2016 Electronic form version 1.4