Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Tracking dynamic wave packets in the O_2 dication using a pump/probe approach[1] S. DE, I. BOCHAROVA, M. MAGRAKVELIDZE, D. RAY, W. CAO, U. THUMM, I.V. LITVINYUK, C.L. COCKE, J. R. Macdonald Laboratory, Dept. of Physics, Kansas State University, Manhattan, KS 66506, USA, B. BERGUES, M.F. KLING, Max-Planck Institute of Quantum Optics, Hans-Kopfermann Strasse 1, D-85748 Garching, Germany — Vibrational wave packet dynamics in the O_2 dication have been tracked with few-cycle near-infrared laser pulses. Bound and dissociating wave packets were launched and subsequently probed via a pair of 8 fs pulses at 800 nm. Ionic fragments from the dissociating molecules were monitored using a velocity-map imaging apparatus. Pronounced oscillations in both the time-dependent kinetic energy release spectra and in the time-dependent fragment yields were observed. Facilitated by the observation of vibrational revivals, the dynamics of the wave packets on specific potential energy curves of the O_2 dication are discerned. Quantum and semi-classical calculations are in good agreement with the measured dynamics.

[1]Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy. W.C. and M.F.K. are also supported by the National Science Foundation under CHE-0822646.

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Date submitted: 26 Jan 2010 Electronic form version 1.4