

Abstract Submitted
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Tracing nuclear wave-packet dynamics in diatomic molecules with XUV pump- and probe- pulses¹ M. MAGRAKVELIDZE, KSU, O. HERRWERTH, MPQ, Y.H. JIANG, MPIK, A. RUDENKO, CFEL, M. KURKA, MPIK, L. FOUCAR, CFEL, K.U. KÜHNEL, MPIK, M. KÜBEL, MPQ, N.G. JOHNSON, KSU, MPQ, C.D. SCHRÖTER, MPIK, S. DÜSTERER, R. TREUSCH, DESY, M. LEZIUS, MPQ, I. BEN-ITZHAK, KSU, R. MOSHAMMER, MPIK, J. ULLRICH, MPIK, CFEL, M.F. KLING, KSU, MPQ, U. THUMM, KSU — We traced the femtosecond nuclear wave-packet dynamics in ionic states of oxygen and nitrogen diatomic molecules employing 38 eV XUV pump and probe at the Free Electron Laser in Hamburg (FLASH).² The nuclear dynamics is monitored via the detection of coincident ionic fragments using a reaction microscope and a split-mirror setup to generate the pump and probe pulses. By comparing measured kinetic-energy-release (KER) spectra with classical and quantum-mechanical simulations,³ we identified electronic states of the molecular ions that are populated by ionization of the neutral molecule. The comparison of measured KER spectra for specific fragment-charge states allows assessing the relevance of specific dissociation paths.

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²Y. H. Jiang *et al.*, PRA **82**, 041403(R) (2010).

³I. A. Bocharova *et al.*, PRA **83**, 013417 (2011)

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