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Phase-tagged non-sequential double ionization of N_2, O_2, and CO in 4-fs laser fields[1] NORA G. JOHNSON, J. R. Macdonald Laboratory, Kansas State University, USA, M. KUEBEL, Max-Planck-Institut fuer Quantenoptik, Germany, K. J. BETSCH, University of Virginia, USA, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Kansas State University, USA, R.R. JONES, University of Virginia, USA, G.G. PAULUS, Institut fuer Optik und Quantenelektronik, Friedrich-Schiller-Universitaet, Germany, R. MOSHAMMER, J. ULLRICH, Max-Planck-Institut fuer Kernphysik, Germany, B. BERGUES, M.F. KLING, Max-Planck-Institut fuer Quantenoptik, Germany — Being widely regarded as a prototype process for correlated dynamics, non-sequential double ionization (NSDI) has been the subject of numerous experimental and theoretical studies. It is generally understood in the framework of a recollision model. Using reaction microscope detection combined with a single shot phase meter, we phase-tag each double ionization event and thus study the sub-cycle dynamics of the NSDI by exposing the target particles to known near-single cycle waveforms. In a recent study on NSDI in argon using this technique, we obtained the CEP dependence of the total double ionization yield and the asymmetric longitudinal recoil momentum, from which our understanding of the NSDI process in atoms can be rigorously tested. Here we extend our studies to NSDI in N_2, O_2, and CO in 4-fs laser fields and gain further insight into the recollision process for molecules.

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