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Detailed Dissociation Dynamics Following Valence Photo-Double Ionization (PDI) of O_2 and N_2 A. GATTON, Auburn University, I. BOCHAROVA, B. GAIRE, Lawrence Berkeley National Laboratory, A.L. LANDERS, Auburn University, TH. WEBER, A. BELKACEM, Lawrence Berkeley National Laboratory, T. JAHNKE, R. DÖRNER, Institute für Kernphysik, University of Frankfurt, AMOS COLLABORATION — We compare the dissociation dynamics in the valence Photo-Double Ionization (PDI) of O_2 and N_2. COLd Target Recoil Ion Momentum Spectroscopy (COLTRIMS) was used to gather a kinematically complete coincidence measurement of both photoelectrons and recoil ions. PDI can occur by either direct simultaneous emission of both photoelectrons or indirectly by the ejection of a single photoelectron which leaves behind an excited cation that then undergoes autoionization. While we observe both processes in each molecule, O_2 favors the indirect and N_2 the direct path. We identify the electronic states involved with kinetic energy maps of recoil ions and electrons and with Molecular Frame Photoelectron Angular Distributions (MFPADs). We display the photoelectron relative angles to show which double ionization mechanisms are responsible for the PDI.

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