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Laser-Enabled Interatomic Coulomb Decay (ICD) Dynamics in Ar Dimer PREDRAG RANITOVIC, ELI-ALPS, ELI-Hu Nkft, Dugonics ter 13, Szeged H6720, Hungary, XIAO-MIN TONG, Division of Materials Science, Faculty of Pure and Applied Science, University of Tsukuba, Ibaraki 305-8573, Japan, C. HOGLE, L. MARTIN, JILA and Department of Physics, University of Colorado and NIST, Boulder, CO 80309, USA, K. UEDA, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai 980-8577, Japan, M.M. MURNANE, H.C. KAPTEYN, JILA and Department of Physics, University of Colorado and NIST, Boulder, CO 80309, USA — We used XUV radiation in combination with an IR laser field to enable *and* control Interatomic Coulomb Decay processes in Ar dimer. A hollow Ar dimer, with a 3s electron kicked-out by a 36 eV XUV pulse, is a weakly bound molecular assembly, vibrating with a period of 300 fs. This 3s hole state decays radiatively since the ICD process is energetically forbidden. By adding the IR laser pulses, we can enable *and/or* control the ICD process as we delay the probe IR pulses relative to the XUV pump pulse. We have studied these processes by utilizing Coulomb-Explosion imaging in a COLTRIMS geometry where we measured full 3D momenta of the coincident Ar^+ monomers coming from the same Ar dimer. By enabling the ICD process at different internuclear distances of the vibrating hollow Ar dimer, we open different CE channels with a distinctive signature in the measured kinetic energy releases. To the best of our knowledge this is the first work that demonstrates a time-resolved control over an ICD processes.

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