Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Inter Coulombic Decay of Molecular Dimer WAEL ISKANDAR, AVERELL GATTON, BISHWANATH GAIRE, KIRK LARSEN, ELIO CHAMPENOIS, NIRANJAN SHIVARAM, Lawrence Berkeley National Lab., ALI MORADMAND, Auburn University, TRAVIS SEVERT, Kansas State University, JOSHUA WILLIAMS, University of Nevada, DANIEL SLAUGHTER, Lawrence Berkeley National Lab., ITZIK BEN-ITZHAK, Kansas State University, THORSTEN WEBER, Lawrence Berkeley National Lab. — Excited system embedded in environment can efficiently transfer its energy to neighboring species by ionizing them. This ultrafast de-excitation is known as the Inter-Coulombic Decay (ICD). Theoretical and experimental investigation showed that the ICD is a very common decay route in nature as it occurs after exciting a loosely bound system (e.g. van-der-Waals or Hydrogen bonds) by ions, electrons, or photons. These studies showed that the secondary electrons emission from the ICD process induce strand breaks damage to DNA and may be used as well for DNA repair enzymes (i.e. photolyases). Studying large complex system such as multi-atomic molecular dimer is very important for further exploration of Auger electron driven cancer therapy. The present experiment was performed at the Advanced Light Source in Berkeley using 37 to 55 eV of photon energies in order to investigate the dissociation dynamics of CO_2 and O_2 dimers. We focused more specifically on the doubly charged symmetric fragmentation channel of both dimers. The 3D momentum reconstruction of all detected fragments and electrons reveals that the ICD plays an important role on the production of both fragmentation channels.

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Date submitted: 26 Jan 2018 Electronic form version 1.4