

ULTRAFast ELECTRON DIFFRACTION OF THE PHOTODISSOCIATION OF BROMOCYCLOPROPANE

JACKSON LEDERER, *Department of Physics and Astronomy, University of Nebraska - Lincoln, Lincoln, NE, USA*; PEDRO NUNES, *HeXI, Diamond Light Source, Didcot, United Kingdom*; CONOR RANKINE, *Department of Chemistry, University of York, York, United Kingdom*; SLAC MEV-UED COLLABORATION, *Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA, USA*; MARTIN CENTURION, *Department of Physics and Astronomy, University of Nebraska - Lincoln, Lincoln, NE, USA*.

In this work, the photodissociation of bromocyclopropane (BCP) was captured using gas phase ultrafast electron diffraction at the SLAC MeV-UED facility. BCP is a prototypical molecule for the study of organobromides, a class of molecules that have a significant impact on the Earth's atmospheric ozone through their photochemistry. Thus, studying the dynamics of BCP offers a deeper understanding of organobromide photoreactivity. Previous studies⁴ have revealed two possible reaction pathways for the dissociation of BCP; either the bromine dissociates from the BCP molecule leaving behind a cyclopropyl ring, or there is a concerted opening of the cyclopropyl ring along with the dissociation of the bromine. Experimental results are compared to simulation for the first few picoseconds of the reaction, showing good agreement for the first picosecond. The results of this study indicate that the majority of BCP molecules follow the first reaction pathway in which the cyclopropyl ring remains closed during the bromine dissociation.

⁴Orr-Ewing et al., *J. Chem. Phys.* 144, 244312 (2016).