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Characterization of the ultrafast structural response in photoexcited materials using femtosecond electron diffraction

ABSTRACT

Ultrafast electron diffraction (UED) has become a successful tool to characterize the ultrafast charge and structural response in photoexcited materials. As part of a seed grant, we have developed and implemented the capability to carry out UED experiments in our instrument at UNL. In this presentation we will describe the setup along with its capabilities and limitations. We have carried out first proof-of-principle experiments on NbOI₂, a material that has generated a lot interest recently but so far the structural dynamics have not been explored. We will show here the results of our UED measurements that have captured unexpectedly large structural changes and present our preliminary interpretation.

BIO

Martin Centurion is the Susan J. Rosowski Professor of Physics and Astronomy at the University of Nebraska- Lincoln. He received his BS in Physics with highest distinction from the University of Michigan – Ann Arbor in the year 2000, and his PhD from Caltech in 2005 in the group of Prof. Demetri Psaltis. He was a Postdoctoral Scholar in the Center for the Physics of Information at Caltech for a year, and then from 2006-2009 he was an Alexander von Humboldt Postdoctoral Research Fellow at the Max Planck Institute of Quantum Optics in Garching, Germany. In 2009, he joined the University of Nebraska – Lincoln as an Assistant Professor, was promoted to Associate Professor in 2014 and to full professor in 2021. In 2010 he was a recipient of the of the Early Career Award from the Department of Energy Basic Energy Sciences, and in 2020 he became a fellow of the American Physical Society.