Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Ultrafast Electron Diffraction from Laser-Aligned CS_2 Molecules

JIE YANG, CHRISTOPHER HENSLEY, MARTIN CENTURION, University of Nebraks-Lincoln — Electron diffraction from laser-aligned molecules is a powerful method for studying molecular structure and dynamics. In this method, the molecular structure and angular distribution can be measured simultaneously from a single diffraction pattern. We have used ultrafast electron diffraction to study the structure and dynamics of impulsively laser-aligned carbon disulfide (CS_2) molecules. The experimental data shows that the degree of alignment saturates for a laser fluence of 0.8 J/cm^2, which is in disagreement with simulations. This could be due to the excitation of vibrational modes in the molecule. We have also observed that the saturation depends not only on the fluence but also on the pulse duration, and that the angular distribution continues to change after the saturation. From the diffraction patterns at peak alignment and the revival structure, we have concluded that there is no major deformation, such as bending excitation, in molecular structure. Moreover, no significant dissociation is observed until the intensity reaches 3X10^{13}W/cm^2.

Jie Yang
University of Nebraks-Lincoln

Date submitted: 28 Jan 2014 Electronic form version 1.4