Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Role of electronic structure in ionization and fragmentation of endohedral fullerenes $Ho_3N@C_{80}$ in an intense femtosecond laser field[1] HUI XIONG, Univ of Connecticut - Storrs, LI FANG, University of Texas at Austin, TIMUR OSIPOV, LCLS/SLAC, EMILY SISTRUK, LLNL, THOMAS WOLF, PULSE/SLAC, BENOIT MIGNOLET, FRANCOISE REMACLE, University of Lige, MARKUS GHR, Potsdam University, NORA BERRAH, Univ of Connecticut - Storrs — The ionization and fragmentation of gas phase endohedral fullerene $Ho_3N@C_{80}$was investigated using ultrashort 800 nm laser pulses with an ion velocity map imaging (VMI) spectrometer. The power law's dependence I^n on laser intensity of the singly, doubly, and triply charged $Ho_3N@C_{80}$ molecule and Ho^+ ion fragments have been experimentally determined. Theoretical calculation indicates that the superatom molecular orbitals (SAMOs) electronic states in $Ho_3N@C_{80}$ can be populated through direct multiphoton excitation. The ionization power law essentially reflects the photoexcitation step to the SAMOs. In addition to the molecular nuclear frame heating by electron-vibrational coupling, we observe a rapid heating process, which could be an 'avalanche' process, produced via semi-free electrons impacting the molecular nuclear frame at high laser intensity.

[1]This work is funded by the Department of Energy, Office of Science, Basic Energy Sciences, Division of Chemical Sciences, Geosciences and Biosciences under grants No. DE-SC0012376 and DE-SC0012628.

Hui Xiong
Univ of Connecticut - Storrs

Date submitted: 29 Jan 2016 Electronic form version 1.4