Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Ionization dynamics of metallo-endohedral fullerenes using hard x-rays from the SACLA Free Electron Laser[1] RAZIB OBAID, UConn, SVEN AUGUSTIN, KIRSTEN SCHNORR, MPIK, NORA KLING, UConn, TSUKASA TAKANASHI, Tohoku U., KUNO KOOSER, U. Turku, THOMAS WOLF, SLAC, DAEHYUN YOU, Tohoku U., KIYONOBU NAGAYA, Kyoto U., SHIN-ICHI WADA, Hiroshima U., ELEANOR CAMPBELL, U. Edinburgh, LI FANG, UT Austin, CLAUS-PETER SCHULZ, MBI, THOMAS PFEIFER, MPIK, PASCAL LABLANQUIE, UPMC, HIRONOBU FUKUZAWA, Tohoku U., EDWIN KUKK, U. Turku, KIYOSHI UEDA, Tohoku U., NORA BERRAH, UConn — We have investigated the ionization dynamics of a metallo-endohedral fullerene, $Sc_3N@C_{80}$, subsequent to core shell ionization using x-ray pump x-ray probe from the SACLA FEL. We site-selectively ionize the Sc (1s) with a fs hard x-ray pulse (pump) at 4.55 keV photon energy inducing core-ionization followed by an Auger cascade, to determine how electronic rearrangement affects nuclear motion leading to atomic rearrangement, bond elongation and breaking, fragmentation of the moiety and the cage, and bond (re)-forming. With a well-defined delayed second x-ray pulse (probe) at a photon energy of 5.0 keV, we monitored the transient structural changes by imaging the fragment ions. Results will be presented showing the effect of these two hard x-ray pulses on the fragmentation dynamics of the parent molecule. This work scientifically contributes in opening up new possibilities of studying gas phase ultra-fast dynamics using hard x-ray pulses on large molecular targets, such as metallo-endohedral fullerenes.

[1]Funded by the DoE-BES under Grant No. DE-SC0012376.

Razib Obaid
University of Connecticut

Date submitted: 31 Jan 2019 Electronic form version 1.4