Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

**Initial state and polarization dependence of multi-photon ionization of Li**[1] NISHSHANKA DESILVA, BISHNU ACHARYA, KEVIN ROMANS, THUSITHA ARTHANAYAKA, KATRINA COMPTON, KYLE FOSTER, SACHIN SHARMA, DANIEL FISCHER, Missouri University of Science and Technology — After the development of femto-second intense laser sources, numerous studies of multi-photon or tunnel ionization revealed details of the atomic processes and opened routes to control their dynamics. As far as atoms are concerned, earlier experiments were mostly limited to noble gases because they are easily prepared at low temperatures for ionization studies. Here, we report on experiments performed with lithium. In contrast to noble gases, Li has only a single valence electron whose state can optically be excited before the ionization by the intense laser pulse. We prepare our Li target in an all optical trap (AOT) by laser cooling achieving milli-Kelvin temperatures. The atoms can be excited to a p-state with full control of the magnetic sublevel, i.e. the orientation of the angular momentum vector. After the ionization with 7 fs pulses of an OPCPA with intensities exceeding $10^{12}$W/cm$^2$, the momentum vector of the electron is measured in a Reaction Microscope. This enables to address fundamental questions on the initial state dependence of multi-photon ionization. In particular, the influence of relative polarizations of target and laser pulse is studied and the most fundamental conceivable helical systems and their short-time dynamics in intense strong fields is investigated.

[1]MST,NSF

Nishshanka Aruma Handi DeSilva
Missouri University of Science and Technology

Date submitted: 01 Feb 2019 Electronic form version 1.4