Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Multi photon ionization of state-prepared Li atoms in ultra-short laser pulses.[1] NISHSHANKA ARUMA HANDI DESILVA, BISHNU P. ACHARYA, K.L. ROMANS, SACHIN SHARMA, DANIEL FISCHER, Missouri Univ of Sci Tech — In the last 20 to 30 years, highly controllable, extremely short and intense optical laser pulses became available. Pulses can reach durations close to the single-cycle limit at electric field strengths exceeding atomic Coulomb fields by many orders of magnitude. In conjunction with cold target recoil ion momentum spectroscopy (COLTRIMS), new and before inconceivable possibilities to study atomic few-particle dynamics became accessible. Earlier experiments focused on the ionization of noble gases and molecular targets from ground state. Here we report on an experiment using a lithium target which can be prepared in excited or polarized states before ionizing it. This allows to obtain substantial additional insights. By modifying the mutual overlap of single-electron wave functions in the target, the influence of electronic correlations, which are generally very challenging to describe accurately, can be tested and disentangled directly. Moreover, having a single active electron in an excited eigenstate allows one to test angular momentum and orientation effects for well-defined initial and final configurations. This will enable to address the fundamental questions, how electronic correlation and polarization influence the short-time dynamics in strong fields.

[1]NSF Grant No. 1554776 University of Missouri Research Board

Nishshanka Aruma Handi DeSilva
Missouri Univ of Sci
Tech

Date submitted: 26 Jan 2018 Electronic form version 1.4