Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Laser assisted electron-argon scattering at small angles[1] NATHAN MORRISON, CHRIS H. GREENE, JILA, Department of Physics, University of Colorado at Boulder — We investigate the scattering of electrons off of neutral argon in the presence of a linearly polarized, low frequency laser field. Of particular interest is the cross section of electrons scattered at small angles to the field direction, where the Kroll Watson approximation becomes less accurate. We represent the electron wavefunction as a sum over angular momentum and Floquet channels, and use the eigenchannel R matrix method to solve the Schrödinger equation at small distances in the length gauge. The argon atom is represented in this calculation by a model potential including a screened coulomb term near the origin and a longer range induced dipole interaction. The R matrix is then transformed into the short range reaction matrix in the Kramers-Henneberger (acceleration) representation using spherical Gordon-Volkov states, and from this the cross section is derived. Experiments have shown the cross section at small angles to be much higher than the approximation for electrons that absorb or emit photons, and we hope to gain insight into this phenomenon with this method.

[1]This work was supported by the DOE.

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Date submitted: 04 Feb 2011 Electronic form version 1.4