Genetic-algorithm implementation of atomic potential reconstruction from differential electron scattering cross sections[1] JUNLIANG XU, ZHANGJIN CHEN, Kansas State University, HSIAO-LING ZHOU, Georgia State University, CHII-DONG LIN, Kansas State University — We demonstrate the successful implementation of genetic algorithm for the retrieval of atomic potentials using elastic differential cross sections (DCS) between free electrons and atomic ions for electron energies from a few to several tens of electrons volts. Since the DCS over this energy region can be extracted from laser-generated high-energy photoelectron momentum spectra, the results suggest that infrared lasers can be used to image the target structure. Extending to molecular targets, in particular, to transient molecules created by an earlier pump pulse, our results suggest that few-cycle infrared probe lasers can be used for dynamic chemical imaging with temporal resolution of a few femtoseconds.

Junliang Xu
Kansas State University

Date submitted: 21 Jan 2009   Electronic form version 1.4