DAMOP05-2005-000447

Abstract for an Invited Paper
for the DAMOP05 Meeting of
the American Physical Society

Obtaining the complex correlation functions of photo-double ionization in helium[1]

BERTOLD KRÄSSIG, Chemistry Division, Argonne National Laboratory

The three particle breakup in photo-double ionization of helium, in dipole approximation, is fully characterized by two complex correlation functions. I will present a method to obtain these functions from experiment. The method is particularly well suited for experiments with 4π imaging of the two emitted photoelectrons, or of one electron and the recoiling photoion, as in COLTRIMS experiments. With unpolarized light or linearly polarized radiation one obtains the absolute magnitudes of the two correlation functions and the cosine of their relative complex phase. From these quantities one can deduce all observables in this process except for the direction of the circular dichroism or any spin-related observables. With a circular component in the incoming radiation one also obtains the sine of the relative phase and the degree of circular polarization. I will also discuss the effect of nondipolar corrections and the prospects of obtaining information on the three additional correlation functions originating from quadrupolar contributions in the interaction.

[1]This work was funded by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy.