

Retrieving the structural information from the photoelectron holography

Yueming Zhou¹, Oleg I. Tolstikhin², and T. Morishita¹

¹ Department of Engineering Science and Institute for Advanced Science,
The University of Electro-communications, 1-5-1 Chofu-ga-oka, Chofu-shi, Tokyo 182-8585, JAPAN,

² Moscow Institute of Physics and Technology, Dolgoprudny 141700, Russia

Holography is the interference between two coherent waves that follows two different paths. When atom or molecule is illuminated by a strong laser pulse, an electron wave packet is created through tunneling. This wave packet oscillates in the laser fields and part of it will be driven back to the parent ion and scatter off before it reaches the detector, and part of it will go to the detector directly. These two parts will interfere and form the photoelectron holography. Because the scattering electron wave encoded the information of the parent ion, we can extract structural information from the photoelectron holography. Here, based on our adiabatic theory, we will show how the phase of the scattering amplitude can be retrieved from the holography.