

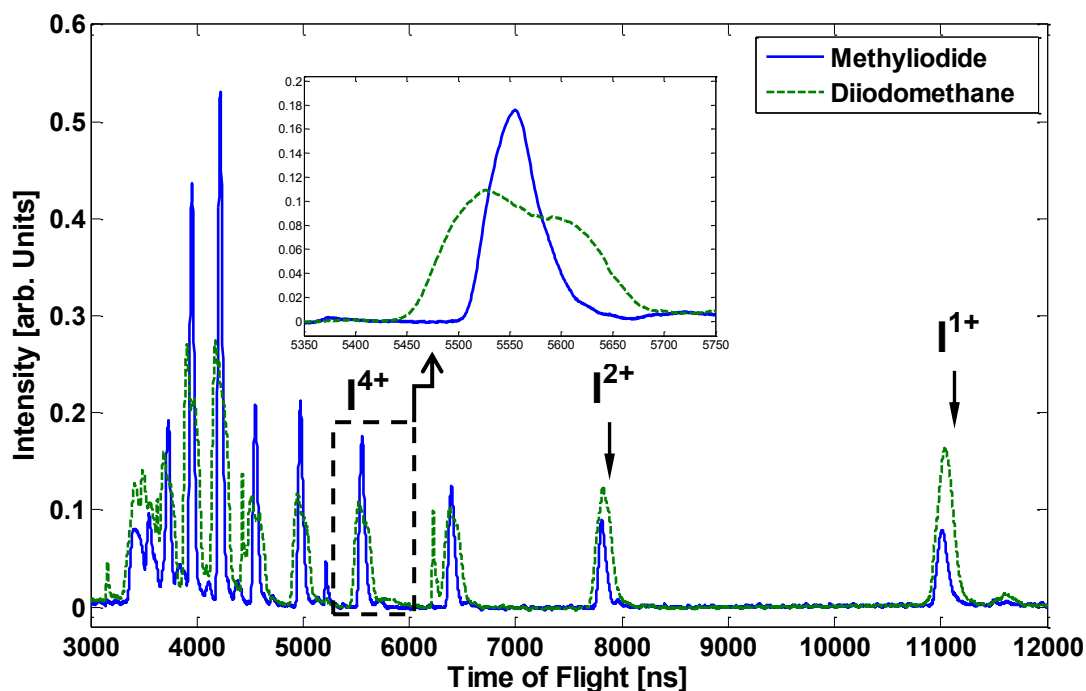
Coulomb interaction in multiphoton ionization of Iodine-containing molecules

N. Gerken¹, S. Klumpp¹, M. Dell'Angela¹, W. Wurth¹, M. Martins¹

¹*Institut für Experimentalphysik, Universität Hamburg,
Luruper Chaussee 149, 22761 Hamburg, Germany
E-Mail: nils.gerken@desy.de*

We present multi-ionization processes of Iodine-containing molecules and Xenon in the region of the giant resonance measured with ion mass-to-charge spectroscopy at ultrahigh intensities. In our experiment at the free-electron laser facility FLASH we reached photon intensities of up to 10^{12} - 10^{14} W/cm² at pulse lengths of a few hundred femtoseconds. We observed different Coulomb interaction schemes due to different charge state distributions at two different molecular types of halides.

By using a covariance mapping tool we can directly observe different regimes of charge migration in iodine containing molecules, especially the regions of ultrahigh photon flux reveal the nonlinear and unique high charge state levels which can only be produced by using ultrahigh photon fluxes. Kinetic energy release (KER) information, separately observed different charge state configurations of a two iodine atoms containing molecule can easily be obtained out of the covariance maps.



Ion Time-of-Flight Spectra of two different Iodine-containing molecules taken at a photon energy of 93 eV.