

"Rare Gas Atoms and Clusters in the Focus of Intense VUV Free-Electron Laser Light"

Abstract:

This contribution reports on results of the interaction of intense vacuum-ultraviolet pulses with rare gas atoms and clusters. In recent years much effort has gone into the understanding of the interaction of intense visible and infrared femtosecond laser pulses with matter, especially with clusters. Very recently the free-electron laser (FEL) at DESY has reached a gain of 106 and provides gigawatt pulses of 30-100 fs length. The radiation wavelength is tunable in a wide range from 80-180 nm. This regime is particularly interesting, because it covers the ionisation energy of xenon, as well as the excitonic bulk and surface absorption bands of argon clusters. By varying the photon energy, resonant and non-resonant multiphoton ionization can be induced. In this contribution time-of-flight mass spectra and photoemission spectra are presented, in order to discuss the effect of excitation energy and VUV-laser intensity on the energy absorption of rare gas atoms and clusters.