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**Studies of Electron-Impact Induced Ionization of Atoms and Molecules Using Multi-Particle Imaging
Techniques**

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Reaction microscopes allow the measurement of the momentum vectors of all fragments produced in ionizing collisions. We have developed such a multi-particle spectrometer for the investigation of electron scattering processes. Here novel studies of fundamental few-body reactions will be presented. For single ionization of helium by fast ($E = 1000$ eV) and by slow ($E = 105$ eV) electron impact the three-dimensional electron emission patterns show structures which, so far, have not been observed in conventional experiments. Kinematically complete experiments for double ionization of helium by electrons with energies close to the threshold enable for the first time a detailed insight into the behaviour of three strongly interacting continuum electrons in the field of the residual ion. Finally, results for ionization of simple molecules as hydrogen or water are discussed where the dependence of the ionization dynamics from the alignment of the molecular axis with respect to the incoming projectile beam can be studied.