

INVESTIGATING FEW PARTICLE DYNAMIC - ATOMS AND
MOLECULES UNDER THE REACTION MICROSCOPE

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Abstract. The reaction microscope or the so called COLTRIMS-technique (COLd Target Recoil Ion Momentum Spectroscopy) is a novel momentum imaging technique to investigate the dynamics of ionization processes of atom, molecules and clusters, induced by particle impact or single/multiple photon absorption. Thereby the particle can either be a charged ion or electron, but also a neutral fast moving projectile. It allows the measurement of the full three dimensional momentum vector of all during the ionization process ejected charged particles (ions and electrons as well) with a 4π acceptance angle to provide kinematically complete experiments. We review the technical development from the last 15 years and give an overview of the key experiments performed with this technique. These studies opened a new window onto the correlated motion of the fragments of atomic and molecular breakup processes, super high resolution, detail and completeness. Finally we give an outlook on the exciting future prospects of this method for atomic and molecular physics.