PHOTOELECTRON IMAGING FROM NANOSECONDS TO FEMTOSECONDS

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Photoelectron imaging can reveal a wealth of information on the structural and dynamical properties of small molecules and their ions. Using nanosecond lasers we distinguish direct and autoionization pathways in transient and reactive atoms and molecular radicals such as Fe from a discharge source or S atoms from OCS photodissociation. With picosecond lasers the rapid change in molecular geometry as methyl iodide dissociates is revealed in the photoelectron image as rich vibrational structure of excited CH$_3$I$^+$. Trends from these simple systems are used to help interpret the complex time-dependent photoelectron images measured in femtosecond pump-probe studies of the molecule tetrakis, an amino-substituted ethylene. This overview describes work done in Nijmegen, at the FORTH facility in Crete with T. Kitsopoulos, and at the SLIC facility in Saclay with B. Soep and coworkers.