Imaging Chemistry in Atomic Detail

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Abstract

Chemical reactions are the result of successful collisions between reactants (atoms or molecules) of appropriate energy and orientation. Understanding the mechanism in its quantum detail means finding out what energies and orientations lead to reactive collisions at the atomic scale. That knowledge not only improves our understanding of chemical reactivity, but also provides additional levels of control on chemical reactions, opening the way for technological applications.

To obtain this information two experimental approaches are used. The first is measuring the *energy* and *spatial orientation* of quantum-state-selected reaction products, with velocity map & slice imaging being the state of the art techniques used. The second approach involves probing the structure of the reactants as they transform into products as a function of time (structural dynamics) with time-resolved X-ray or electron diffraction as the techniques of choice.

In this talk we will present the lab's recent slice imaging work on the effects of weak bonding on photochemistry dynamics. We will also discuss the progress on a structural dynamics approach using time-resolved electron diffraction currently under development at FORTH.