Crete Team

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Research Interests

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The group is interested in studying chemical dynamics. Specifically my experiments aim towards the determination of the state-to-state differential cross sections for a chemical process be it a full or half collision. Our main experimental methodology involves velocity mapping or ion imaging. Initial experiments conducted on Crete have been concerned with determining the Branching Ratios for the various electronic states of hot atoms or radicals produced by photofragmentation. Recently we made a major improvement in traditional photofragment imaging that we call ***slice imaging***. This new method improves the sensitivity to spatial anisotropy parameters such that we are able to measure the photofragment alignment and orientation from single ion images, that offers additional detail information on the structure and dynamics of multiple / interfering excited electronic states. In a second series of experiments we have been investigating the reactivity of photolytically produced species (hot atoms or radicals). There are two types of experimental approaches. The first is ***photoloc*** product imaging, where precursor reagents are premixed and co-expanded. The hot atom or radical is produced photolytically and products are rovibrationally state selected using resonant enhanced multiphoton ionization (REMPI). The speed distribution is measured using velocity mapping and analysis using either direct or Fourier basis set analysis yield the state resolved differential cross section (SRDCS). The reactions of Cl+ethane and Cl + Butane reaction have been studied using this technique. More recently a major breakthrough has been achieved where we have been able to measure SRDCS using a crossed molecular beam setup and (2+1) REMPI detection of products. This novel approach lends itself to a plethora of polyatomic chemical reactions to be studied with rotational resolution.

AWARD: Theofanis Kitsopoulos was awarded the 2003 Bodossaki Foundation Scientific Prize for work in Basic Sciences