MO 19: Photochemie

Zeit: Donnerstag 16:30–19:00 Raum: Poster C1

MO 19.1 Do 16:30 Poster C1

3D Velocity Mapping: Dynamics of the reaction $O(^1D) + N_2O \rightarrow 2NO$ photoinitiated in the $(N_2O)_2$ dimer — Niels Goedecke[1], Sebastian Kauczok[1], •Christof Maul[1], Alexey Chichinin[1,2], and Karl-Heinz Gericke[1] — [1]Institut für Physikalische und Theoretische Chemie, TU Braunschweig — [2]Institute of Chemical Kinetics and Combustion, Russian Academy of Sciences, Novosibirsk

3D velocity mapping allows state specific characterization of full three dimensional velocity distributions of reaction products following resonance-enhanced multi-photon ionization (REMPI). 3D resolution is achieved by using a time-of-flight (TOF) spectrometer equipped with a two-dimensional delay line behind a micro channel plate stack which simultaneously returns impact position and time of the selected reaction product. Inserting an Einzel lens into the TOF spectrometer allows to map the product velocity and to get rid of image distortion due to the unavoidable length of the ionization laser focus.

The technique has been used to investigate the reaction of $O(^1D)$ with N_2O in the $(N_2O)_2$ dimer. $O(^1D)$ is generated by photodissociation of N_2O using an ArF excimer laser. The reaction yields two NO molecules which are subsequently ionized via a (1+1)-REMPI process by a dye laser. We have measured selected quantum state specific 3D velocity distributions of the NO product as well as spectra for several vibrational states ($v \leq 7$) of the electronic ground state $X(^2\Pi_\Omega)$. The rotational temperature is low, in agreement with earlier investigations of the cluster reaction, but in striking contrast to the free collision.