



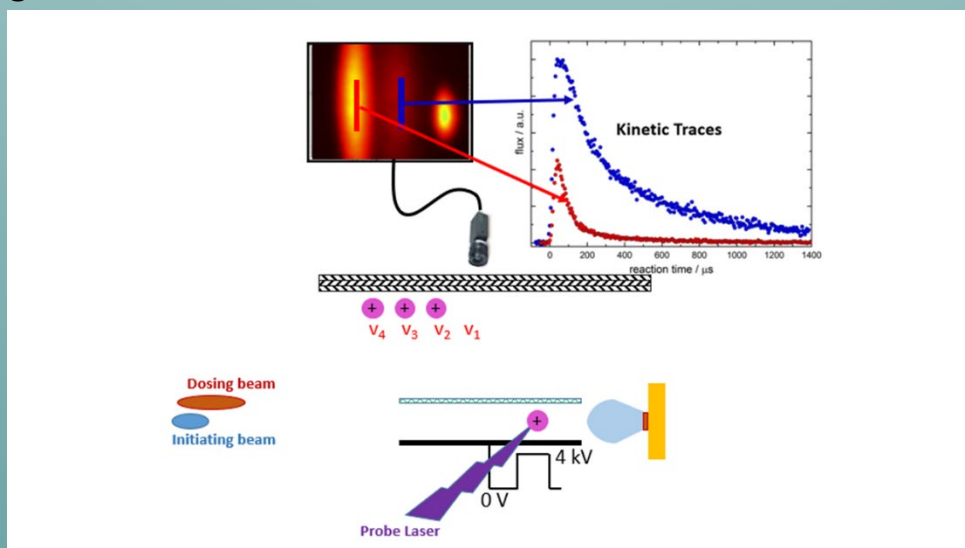
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Velocity Resolved Kinetics:

A new tool for heterogeneous catalysis that measures reaction rates for elementary reactions and identifies active sites

I will introduce the use of slice imaging to measure catalytic rates for site-specific elementary reactions thus offering remarkable opportunities to advance our fundamental understanding of heterogeneous catalysis. We call this approach Velocity Resolved Kinetics (VRK). This strategy makes the formidable task of describing site-specific chemical reaction mechanisms and elementary rates in heterogeneous catalysis facile, while its necessity we justified (Nature 2018) on the prototypical CO oxidation reaction on Pt. I will show examples of reactions involving atoms H, O, N, and how to measure important factors that influence the kinetics of elementary reactions at surfaces, e.g. the chemical nature of the catalyst and the geometry of the active site. VRK is a “bottom-up” approach to catalysis, i.e., building and understanding complex heterogeneous chemical catalysis, from the site-specific kinetics of the elementary building block reactions. Our measurements, serve for benchmarking first principles calculations of reaction rates in surface chemistry. Our methodology measures the kinetics in the 10^{-6} s regime with temperatures in the 200 to 1000 K range, i.e, conditions more relevant to industrial conditions.



Tuesday, 14.06.2022, at 17:15 h in lecture hall A

Innsbruck Physics Colloquium, Organisation: M. Beyer, H.-C. Nägerl, A. Reimer