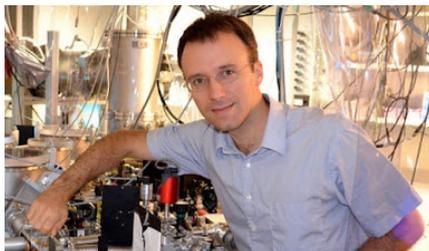


2020 New Horizons Solvay Lectures in Chemistry



Prof. Hans Jakob Wörner (ETH Zürich, Switzerland)

Hans Jakob Wörner's main research focus is the ultra-fast spectroscopy of molecules with an attosecond time resolution ($1\text{as} = 10^{-18}\text{ s}$) and the development of new experimental methods to characterize the structure and dynamics of the valence shell of molecules. He has been an Assistant Professor at the Laboratory of Physical Chemistry in the Department of Chemistry and Applied Biosciences since 2010. He studied chemistry at ETH Zurich, graduating in 2003 and obtaining a doctorate in physical chemistry in 2007. From 2007, he worked as a postdoc at the Laboratoire Aimé Cotton of the CNRS (Centre national de la recherche scientifique) in Orsay, France, and the National Research Council in Ottawa, Canada.

Closing Lecture on Tuesday 14 June at 4.00 pm.

Attosecond spectroscopy and dynamics

Electrons in matter move on attosecond ($1\text{ as} = 10^{-18}\text{ s}$) time scales. Attosecond pulses of light are the shortest events that humans can control today. Attosecond spectroscopy is therefore providing unprecedented insights into the electronic dynamics of matter, which are advancing fundamental knowledge and have the potential of generating new technologies. I will discuss the principles of attosecond spectroscopy and its recent extensions from atoms to molecules, clusters and liquids. These developments reveal how the dynamics of photoionization evolve from isolated particles over finite-sized systems to the bulk. I will then describe the recent development of attosecond soft-X-ray spectroscopy and how it overcomes the complexity gap. I will describe the first direct observation of attosecond charge migration in molecules, as well as its dephasing and revival driven by femtosecond structural dynamics. The lecture will conclude with an outlook on the possibilities offered by attochemistry.

COFFEE AND TEA WILL BE SERVED AT 3:45 P.M IN FRONT OF THE SOLVAY ROOM

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