

## Sub-focal spatially resolved photoionization of gases by ultrashort laser beam pulses

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Nonlinear photoionization processes play a central role in the behavior of atoms and molecules in strong ultrafast laser fields. From a theoretical point of view, the probability of the photoionization process can be calculated at any given value of the electromagnetic field and accordingly at any point in the space region occupied by a strong laser field. On the contrary, in experiments the photoionization signal is usually averaged over the volume of a strong spatially inhomogeneous laser field. Recently, two state-of-the-art techniques have been developed for measuring spatially resolved photoionization yields of gas-phase ions created in an intense-laser focus. The techniques demonstrated new approaches to noninvasive, *in situ* focus diagnostics of sharply focused laser beams.

Here we present a novel simple approach ensuring a way to 'look inside' the laser focus. In our scheme, the photoionization of atoms/molecules in a pulsed focused laser beam is combined with the ion projection microscopy. The ions created by the tunneling ionization in the pulsed laser field located near a 'blunt' metal needle extend their trajectories in a divergent electrostatic field and produce a magnifying image on the detector.

### Biography

B.N.Mironov graduated from MEPhi. He is a senior scientist in Laboratory of Spectroscopy of Ultrafast Processes at the Institute for Spectroscopy RAS. He has published more than 30 scientific papers in refereed journals.

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