Abstract for master's diploma: "Optimization of high order harmonic generation efficiency using mid-infrared pulses in gases"

T.S. Smorodnikova

Thesis advisor: research scientist, E.E. Serebryannikov

High harmonic generation (HHG) process in gases holds promise to obtain Extreme Ultraviolet (EUV) and Soft X-ray radiation sources. These radiation sources are perspective to solve the vast majority of modern scientific tasks. Primarily, they are used to prob and control ultrafast processes in materials.

This paper represents results of semiclassical HHG model modification which in addition to tunneling and quantum interference takes into account nonadiabaticity of ionization and dynamical polarizability of multielectron atoms.

It was shown that in certain conditions consideration of mentioned above effects makes it possible to describe accurately HHG in gases microscopically as well as macroscopically (effects of propagation).

Using this modified model, optimization of parameters of pump pulses, gases medium and geometry of process was performed to obtain highly effective generation of Soft X-ray radiation with the aid of ultrashort powerful mid-infrared pulses.