

## Diploma thesis abstract

### **X-Ray Generation from Xe cluster interaction with femtosecond Cr:Forsterite laser pulses at presence of light carrier gas.**

Student: Golubev A.P.

Scientific advisers: Gordienko V.M., Djidjoev M.S.

Interaction of femtosecond laser pulses at wavelength 1240nm with clusters is investigated.

Experimental set up of Xe-cluster beam generation involving pulsed nozzle with piezoelectric valve is created. Xe-gas and mixture XeNe are used, partial pressure at stagnation chamber being 2-20bar.

Diagnostics of Xe-cluster beams based on Rayleigh scattering of XeCl-laser ( $\lambda=308\text{nm}$ ), of second harmonic of Cr:Forsterite laser pulses and on pyroelectric detection scheme is performed. XeCl-laser diagnostics at pressures 1-6bar revealed power dependence of scattered signal on pressure with power exponent 2.7, at pressures 6-15bar dependence turned to be linear. Cr:Forsterite-laser diagnostics revealed linear dependence at pressures 4-20bar.

Experiments of femtosecond laser-cluster interaction are conducted. X-Ray yield is observed at efficiency of  $1.2 \cdot 10^{-8}$ . Enhancement of cluster concentration at axis area, narrowing of cluster beam, enhancement of X-ray yield when using XeNy mixture are observed.