ANNOTATION

In this paper, the results of an experimental study of the generation of terahertz (THz) radiation during the interaction of intense femtosecond laser pulses with a supersonic gas-cluster jet is presented. The purpose of the research was to study the influence of the size and concentration of clusters in the jet on the efficiency of the conversion of femtosecond optical radiation into terahertz radiation.

Widespread method of supersonic gas expansion into a vacuum through a special nozzle was used to create a cluster jet. The ratio between monomers, clusters of large and small sizes in a gas-cluster jet significantly changes with changing of backing pressure and with changing of distance between nozzle and point of interaction of optical beam with cluster jet. In the experiments, both these parameters were used to control the size and concentration of the clusters. Backing pressure was varied in the range of 0…20 atm, distance was variated from 1.5 to 32.2 mm below the nozzle edge along Axis of its symmetry.

The results of study of the influence of the backing pressure value of the clustered gas and the position of the beam focusing point in the gas-cluster jet on the efficiency of THz radiation generation and on the efficiency of the Rayleigh scattering of an optical pulse in the jet are presented and discussed. The results of the experiment are compared with the results of numerical simulation of the cluster formation process in a supersonic jet formed by argon atoms.