Annotation

In this paper characteristics of the filament generated by the passage of powerful femtosecond laser impulse in the air are being studied using an electrostatic sensor. The author considers the possibility of obtaining the absolute estimate of linear concentration of electrons in the plasma channel. For this purpose, a capacitance meter that can measure single and multiple filamentation in the hard and soft focus was created. A theoretical justification of the method was also carried out as well as obtaining the calculation from the amplitude of the signal of the linear concentration of electrons in the plasma channel in the explicit form.

To generate a filament in the experiment was used Ti:Sa laser system radiation (50 fs pulse duration, 800 nm wavelength, 10 Hz repetition rate, 2-3 mJ average energy for single filament and 10-12 mJ average energy for multiple filamentation). Lenses with a focal length of 50 cm and 3m were used.

Thanks to the electrostatic sensor the linear concentration of electrons in the plasma channel was obtained. The geometrical configuration of the sensor was optimized. This method was compared with the one, using broadband acoustic sensor.