# VISUALISATION OF MOTION DYNAMICS IN THE ELECTRIC FIELD AND RELAXATION OF PLASMA INDUCED IN A LOCALIZED REGION OF CVD DIAMOND VIA LASER LIGHT TWO-PHOTON ABSORPTION

*A.D. SAVVIN*[1], *A.E. DORMIDONOV*[1], *V.P. MITROKHIN*[1], *M.A. BUBLIK*[1], *S.A. POTANIN*[2,3]

[1]*All-Russia Research Institute of Automatics (VNIIA), Moscow, Russia*
[2]*Faculty of Physics MSU, Moscow, Russia*
[3]*Sternberg Astronomical Institute M.V. Lomonosov Moscow State University, Moscow, Russia*

The diamond in normal conditions is a dielectric material. However, when exposed to ionizing radiation or irradiated with ultraviolet light, charge carrier pairs are generated. In diamond, these pairs tend to form free excitons (FE), which under certain conditions condensate to droplet of electron-hole liquid (EHL)[1]. To design and to understand the operation of diamond optoelectronic devices, such as radiation detectors, it is important to have an understanding of the properties of charge drift in an external electric field and plasma relaxation..

Two-photon absorption by focusing intense laser radiation allows to form a localized plasma area [2] that can be visualized. In this work, we studied a sample of CVD diamond placed in a thermostat with the possibility of cooling to liquid nitrogen temperature. An electric field of different polarity and intensity can be applied to sample. For excitation, a picosecond Nd:YAG laser was used, the radiation of which was converted into a third harmonic with a wavelength of 355 nm and a duration of 50 ps.

Two visualization methods are explored. In the first, the dynamics of drift and relaxation of the plasma observed by 532 nm second harmonic scattered on it and delayed in time relative to the exciting pulse. In second method blur of spots corresponding to the luminescence of FE and EHL are observed by UV-sensitive CCD camera combined with a slit-free spectrograph.

REFERENCES

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