



Prof. Vitaly Konov

**Director, Natural Sciences Center
General Physics Institute
Moscow, Russia**

Laser in synthesis, micro and nanoprocessing of diamond materials

The presentation by Prof. Konov will show that intensive laser radiation is a perfect tool for processing of diamond materials: single crystal, poly and nanocrystalline diamond, amorphous diamond-like coatings, micro and nanoparticles. Methods of synthesis and major properties of these materials, such as optical absorption and thermal conductivity, will be briefly reviewed.

Emphasis will be on the mechanisms and general features of laser induced surface and bulk graphitization of diamond. Two basic regimes of diamond ablation (vaporization and oxidation of the laser graphitized diamond surface) will be considered. The specific feature of short-pulsed laser ablation – possibility to remove ultra-thin layers of the diamond material as a result of combined physical and chemical surface treatment (nanoablation) will be discussed.

Basic processing operations will also be covered. They include diamond polishing and shaping, production of conductive pathways, micro and nanostructures on the diamond surface, such as diffractive optical elements. The possibility to laser produce conductive and hollow structures in the diamond bulk, including curved elements, and the techniques of laser assisted diamond CVD, that allow to produce smooth or selective area grown films will be demonstrated. Large area chemical vapor deposition of diamond by means of CO₂-laser plasmatrons in Ar:H₂:CH₄ gas streams and diamond-like coatings deposition via laser ablation of graphite in vacuum will be also presented.

**Wednesday, April 25 - 4:00 pm
Room 136 Jorgensen Hall
Refreshments served at 3:45 pm**

**Host:
Dr. Yongfeng Lu
Department of
Electrical Engineering**

Please Post