

Energy Colloquium

Resonance Nano-Photonics: Heat-Assisted Magnetic Recording, Light Manipulation and Subwavelength Lasing Generation

Dr. Sergey Vergeles

**Landau Institute for Theoretical Physics,
Chernogolovka**

03 November 2015, 16:00

Skolkovo Innovation Center

Technopark, Building 3, Room 407



ABSTRACT:

We present several topics in nano-photonics, discussing the motivation of the research, the recent results and possible future development of the grounding ideas. First, we discuss heat-assisted magnetic recording (HAMR). This technology is aimed to increase the information density on usual magnetic hard drives. The central point of HAMR is heating of a magnetic grain at the disc surface which is intended to change its magnetic polarization in order to store an information bit. Second, we discuss the light manipulation techniques on the small scale. Variation of light polarization and propagation direction are the basic components of the manipulations. Recently structured films were demonstrated to be suitable for producing both the effects. Third, we consider the laser generation in small metallic grains (so-called spaser). We present the basic properties of the system and discuss its possible applications. We consider meta-material which is periodical array of metallic grains embedded in dielectric media furnished by dye molecules. We discuss the anomalous optical properties of the meta-materials observed in experiments. The common feature of all above physical phenomena is the presence of resonance structures used in the design of the systems.

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