

*Laserové centrum HiLASE Vás zve na seminář*

## **Development of predictive tools for the laser tailoring of material properties**

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*Hilase Seminar RP4*

Using intense laser beams, materials can be functionalized by inducing local modifications of the surface topography and/or the band gap, and by triggering local chemical reactions (oxidation, bond restructuring, etc.). Impressive capabilities of ultrashort laser pulses have already enabled the emergence of a wide range of real-world applications, such as surface colorizing and wetting engineering. Novel possibilities are now being explored toward tabletop particle accelerators, high-harmonic generation, potentials of using mixed laser beams. Fundamental novelty behind these applications lies in the laser-induced modification of the electronic structure which is still poorly understood because of lack of ultrafast probing experimental techniques with nanoscale spatial resolution. In this context, improvement of available theories and modeling tools used for studying laser processing is highly demanded for bringing more understanding and accurate predicting of material evolution at nanoscale in a wide range of laser parameters. Developing a bridge between the classical descriptions with first-principle theories is an essential part of advancing laser processing technologies.

In this seminar, I will present how modeling the behavior of electron dynamics upon high intensity enables the possibility to perform reliable predictions for single- and bi-color laser irradiation of semiconductors [<http://www.quantumlap.eu/>]. Two different scales of the same physics will be addressed: modeling of the experimental effects (such as transient reflectivity change), and the corresponding quantum processes (time-resolved dynamics of electron excitation in bandgap material).

***který se bude konat v úterý 28. 3. 2017 od 14:00***

***v přednáškové místnosti laserového centra HiLASE***

***Za Radnicí 828, Dolní Břežany***