



TECHNISCHE
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IAP-SEMINAR

EINLADUNG

Termin: **Dienstag, 10.11.2009 um 16:00 Uhr**
Ort: **Technische Universität Wien,
Institut für Angewandte Physik,
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG
1040 Wien, Wiedner Hauptstraße 8-10**

Vortragende: **M.Phil. Bhasia Bashir**
TU Wien, IAP

Thema: **Ultrashort Laser Matter-Interaction**

Kurzfassung

Recent advances in high-intensity femtosecond laser pulses have made it possible to induce various nanostructures inside a variety of materials. Phenomena of nanohillock-like-defect-formation, explosions, bumps, nanopores and nanogratings like features on surfaces of CaF₂, CR-39 (insulators), Si (semiconductors), Al and Au (metals), by ultra short laser irradiation have been investigated using an Atomic Force Microscope (AFM). The targets were irradiated to Ti:sapphire 25-fs laser pulses with a central wavelength at 800 nm for different fluences (0.06 Jcm⁻² to 3.6 Jcm⁻²) in air as well as under UHV. By combining studies of the surface topography and the emission characteristics of particles during interaction of ultra-short-laser radiation with surfaces in particular during laser ablation, three different types of general processes (sub 100 fs electronic processes like Coulomb explosion (CE) or field ion emission by Surface Optical Rectification (SOR), processes related to electronic plasma (FEP) formation (typically a few hundred fs time scale) and thermal ablation (TA)) could be identified to explain ultrashort-laser ablation of matter at laser intensities around the ablation threshold. In particular, the identification of the unique appearance of individual, localized nano-hillocks, typically a few nm in height and with a diameter below typically 50 nm, can be regarded as characteristic for a strong localized potential energy deposition to the electronic system resulting in CE or SOR. Surface topographical features of irradiated materials are well correlated with the structural changes explored by Raman spectroscopy and nonlinear absorption properties ascertained by Z-scan technique.

*Alle interessierten Kolleginnen und Kollegen sind zu diesem Seminar
(45 min mit anschließender gemeinsamer Diskussion) herzlich eingeladen.*

*W. Husinsky e.h.
(Seminar-Chairperson)*

*H. Störi e.h.
(LVA-Leiter)*