



Book of Abstracts

2nd International Workshop on

Nonlinear Nanostructures for Ultrafast Laser Applications

May 19 - 20, 2011



Max Born Institute

Thursday, May 19, 2011

08:00 - 11:00 **Registration and Information**

09:00 - 09:15 **Welcome**

Focus Session „LASER-INDUCED NANOSTRUCTURES“

1. Nanostructure formation at metal surfaces

09:15 - 10:15 **Scaling law of grating interspace for self-formed periodic structures on a metal surface by femtosecond laser pulses**

S. Sakabe, M. Hashida, S. Tokita, Y. Miyasaka, and Y. Ikuta

10:15 - 10:45 **Femtosecond laser nano-ablation processes of metals discussed with ablation rate, ablated-ion spectroscopy, and crystal structures**

M. Hashida, Y. Miyasaka, Y. Ikuta, S. Tokita, and S. Sakabe

10:45 - 11:00 **Coffee Break**

2. General aspects and structuring in three dimensions

11:00 - 11:45 **Self-organized nano-structure formation upon femtosecond laser ablation**

J. Reif, O. Varlamova, M. Bounhalli, M. Muth, S. Varlamov, and M. Bestehorn

11:45 - 12:30 **Harnessing ultrafast laser induced nanostructures in transparent materials**

P. G. Kazansky, M. Beresna, and M. Gecevičius

12:30 - 13:45 **Lunch**

3. Nanostructure formation in semiconductors and dielectrics

13:45 - 14:30 **Formation process of femtosecond laser-induced nanogratings in fused silica at high repetition rates**

S. Richter, S. Döring, A. Tünnermann, and S. Nolte

14:30 - 15:00 **Review on parameters controlling the formation of laser induced periodic structures in TiO₂ single crystal and thin films**

S.K. Das, A. Rosenfeld, J. O. Bonse, A. Pfuch, W. Seeber, and R. Grunwald

15:00 - 15:15 **Coffee Break**

15:15 - 15:45 **Formation of laser-induced periodic surface structures on dielectrics and semiconductors upon double-femtosecond laser pulse irradiation sequences**

S. Höhm, M. Rohloff, J. Krüger, J. O. Bonse, and A. Rosenfeld

16:00 - 17:30 **Lab Visits at the Max-Born-Institute**

17:30 - 18:00 **Poster Session**

Poster 1 **Characteristics of ions emitted from the nano-ablation processes with femtosecond laser pulses of the fluence near ablation threshold**
Y. Miyasaka, M. Hashida, Y. Ikuta, S. Tokita, and S. Sakabe

Poster 2 **3D active photonic nanostructures**
E. A. Kabouraki, I. Sakellari, C. Fotakis, M. Vamvakaki, and M. Farsari

Poster 3 **Enhanced third order nonlinearity in nanocrystalline TiO₂ thin films,**
S.K. Das, C.Schwanke, M. Bock, A. Pfuch, W. Seeber, and R. Grunwald

Poster 4 **Compact and tunable sub-20 fs laser source for ultrafast nonlinear applications**
B. Metzger, A. Steinmann, G. Albrecht, and H. Giessen

Poster 5 **Germanium nanowire growth**
R. Bansen, J. Schmidtbauer, T. Teubner, H.P. Schramm, and T. Boeck

Poster 6 **Studies of bound exciton and surface excitonic emissions in nanostructured and bulk ZnO**
M. Biswas, K. Kumar, G. Hughes, D. McCabe, K. Johnston, Marc Dietrich, E. Alves, M. Xia, E. McGlynn, and M. O. Henry

Poster 7 **Nano-indentation study of femtosecond laser induced periodic surface structures on dielectrics and semiconductors**
M. Rohloff, A. Richter, K. Dasari, R. Hertmanowski, S. K. Das, A. Rosenfeld, and R. Grunwald

Poster 8 **Ultrafast electron dynamics in ZnO/Si micro-cones**
E. Magoulakis, E. L. Papadopoulou, E. Stratakis, C. Fotakis, and P. A. Loukakos,

Poster presentations of companies

Poster 9 HoloEye Photonics AG, Presentation of the company
Poster 10 LightTrans GmbH, Presentation of the company
Poster 11 APE GmbH, Presentation of the company

Product presentations of companies

M. Kuhn **LightTrans GmbH, Field Tracing Software VirtualLab™**
H. Bethmann **Lehmans Fachbuchhandlung, Scientific Books**

M. Kuhn, LightTrans GmbH, Field Tracing Software VirtualLab™

18:00 - 20:00 **Get-together at Max-Born-Hall**

08:00 - 11:00 **Registration and Information**

Focus Session „NONLINEAR NANOOPTICS“

4. Plasmonics, metamaterials and nonlinear optics

- 08:30 - 09:15 **Coupling surface plasmon polaritons to excitons in metal-j-aggregate hybrid nanostructures**
P. Vasa, R. Pomraenke, W. Wang, M. Lammers, M. Maiuri, C. Manzoni, G. Cerullo, and C. Lienau
- 09:15 - 09:35 **Direct laser writing of gain and metallic nanostructures**
I. Sakellari, E. A. Kabouraki, V. Purlys, A. Gaidukeviciute, D. Gray, C. Fotakis, M. Vamvakaki, and M. Farsari
- 09:35 - 09:55 **Towards unraveling the mechanism of third harmonic generation in plasmonic nanoantennas**
M. Hentschel, T. Utikal, M. Lippitz, and H. Giessen
- 09:55 - 10:15 **Strong field photoemission from metal nanotips**
M. Gulde, R. Bormann, S. V. Yalunin, A. Weismann, and C. Ropers
- 10:15 - 10:30 **Coffee Break**
- 10:30 - 10:50 **Theory of low-threshold high-order harmonic generation by using field enhancement near metallic fractal surfaces**
K.-H. Kim, A. Husakou, and J. Herrmann
- 10:50 - 11:10 **Optical Harmonic Generation in bow tie nanoantennas**
M. Sivis, M. Duwe, K. R. Siefertmann, Y. Liu, B. Abel, and C. Ropers
- 11:10 - 11:30 **Weak localization of light in ZnO nanorods in space and time**
M. Maschek, S. Schmidt, M. Silies, C. Lienau, D. Leipold, E. Runge, T. Yatsui, K. Kitamura, and M. Ohtsu
- 11:30 - 12:00 **Finite-element method simulations of plasmonic devices and materials**
S. Burger
- 12:00 - 12:20 **Broadband (~1000 nm) carbon nanotube saturable absorber mode-locking of bulk solid-state lasers**
A. Schmidt, G. Steinmeyer, V. Petrov, U. Griebner, S.Y. Choi, W.B. Cho, D.-I. Yeom, K. Kim, and F. Rotermund
- 12:20 - 13:30 **Lunch**

5. Spectroscopy, gain materials and characterization

- 13:30 - 13:50 **Ultrafast electron transport suppression in Au nanowire networks**
E. Magoulakis, A. Kostopoulou, C. Brintakis, A. Andriotis, A. G. Kanaras, A. Lappas, and P. A. Loukakos
- 13:50 - 14:10 **Time-resolved microscopy of fs laser-induced refractive index modifications in the volume of a-SiO₂**
A. Mermillod-Blondin, C. Mauchair, A. Rosenfeld, J. Bonse, R. Stoian, and E. Audouard
- 14:10 - 14:30 **Determination of the photoluminescence quantum efficiency of silicon nanocrystals by laser-induced deflection**
W. Paa, Ch. Mühlig, K. Potrick, T. Schmidt, S. Bublitz, and F. Huisken
- 14:30 - 14:45 **Coffee break**
- 14:45 - 15:05 **Real-space distribution of cavity modes in single ZnO nanowires**
F. Güell, A. R. Gofñi, J. O. Ossó, L. A. Pérez, E. A. Coronado, A. Cornet, and J. R. Morante
- 15:05 - 15:25 **Local nano-structure and morphology of organic thin films**
S. Kühn
- 15:25 - 15:30 **Closing remarks (Organizers)**
- 15:45 - 17:00 **Lab Visits at the Leibniz Institute for Crystal Growth**