3rd German-Japanese Seminar on Nanophotonics

Ilmenau, Germany, 26.-29.09.2010

Welcome Address

Dear Colleagues,

It is our great pleasure to welcome you all to the Third German-Japanese Seminar on Nanophotonics in Ilmenau. We are all looking forward to a very intense three-day conference with a densely-packed program consisting of about 40 oral presentations and 2 poster sessions. A total of 14 of these oral presentations will be given by our Japanese guests: We are particularly happy to welcome them here in Ilmenau! We think that for most of you this is your first visit to Ilmenau and we very much hope that it will not be the last one.

Our thanks also go to the German and European participants who accepted our invitation to present their outstanding research and together provide the other half of a dialogue between two national scientific communities leading in the field of nanophotonics.

The program covers an excitingly broad range of current topics in nanophotonics. The scientific program includes, e.g., the control and manipulation of light on the nanoscale, nano-lithography and materials processing, nano-optical information processing, nano-antennas, different aspects of plasmonics, light-matter interaction and carrier dynamics in nanostructures, ultrafast nanophotonics, to name just a few.

The "history" of this small binational seminar is quickly told. Some eight years ago, our colleague and friend, Professor Motoichi Ohtsu from the University of Tokyo, approached one us (CL) and brought up the idea to organize such a German-Japanese seminar. With a lot of financial help from the Deutsche Forschungsgemeinschaft and the Japanese Society for the Promotion of Science, we organized a small workshop in Berlin (March 17 – 19, 2003) and were overwhelmed by the enthusiastic responses that we received when announcing the workshop. Instead of the anticipated 30 people almost 70 scientists attended the meeting in Berlin and laid the foundation for a successful continuation of this binational seminar series. Four years later, our Japanese friends organized the follow-up seminar which was held in Yonago, September 24 – 28, 2007. We believe that all of the German participants were not only deeply impressed by the warm hospitality of our Japanese hosts but also by the profound interest and the strong competence in the field of nanophotonics in Japan. During a wonderful and memorable dinner, the other one of us (ER) agreed to host the next seminar in 2010. As a consequence, we now have to express our sincere gratitude to the members of the Theoretical Physics groups and the whole team from Ilmenau – in particular Dagmar Böhme – for all their efforts in preparing and organizing this workshop. THANK YOU on behalf of all participants!

Of course, we also want to thank all those organizations, specifically the DFG, JSPS and the Technische Universität Ilmenau, who supported this meeting.

While writing these lines, we looked up some of the old notes on the 2003 seminar. We wrote somewhere – probably in order to convince the DFG to support our workshop - that "*Nanophotonics is an active and rapidly growing area of research, in which physicists, chemists and biologists aim at probing, understanding and manipulating light and matter on nanometer length scales using optical techniques. Light-matter interactions on the nanometer scale are a central issue in nanoscience and nanotechnology as optical techniques provide unique information about the structure, dynamics and function of solid-state, chemical and biological nanostructures.*" Looking at the program of the Third German-Japanese Seminar on Nanophotonics, we have the impression that today's nanophotonics research is at least as active as it was almost a decade ago. We are almost certain that nanophotonics will keep us and many other people busy for many more years to come.

At the time, Professor Ohtsu and ourselves also thought that "*It is the aim of this symposium to bring together in particular Japanese and German scientists working on applications and theory of nano-optics to discuss recent developments and explore new research directions in this area. We attempt to stimulate lively discussions and to encourage scientific co-operations between the participating groups.*" We sincerely hope that the four days of this meeting will significantly contribute to reaching these aims. We very much hope that you all will enjoy some exciting and stimulating days in Ilmenau.

Christoph Lienau
Erich Runge

Program

(Small boldface: invited talks by Japanese guests, 30 min. incl. discussion; other invited talks: 20 min.)

Sunday, 26. September

17:00	Welcome Party	

Montag, 27. September

08:30 – 09:00	Registration	
09:00 – 09:30	Welcome Addresses	
	Representatives of the University	
	Co-Chair Program Committee Lienau, Christoph	Nanophotonics and ultrafast optics
	Co-Chair Program Committee Ohtsu, Motoichi	Nanophotonics: Dressed photon science and technology
09:30 – 10:40	**Session: Light**	
	Kobayashi, Kiyoshi	**Excitation transfer and collective phenomena via optical near-field couplings and local environments**
	Kampfrath, Tobias	Ultrafast manipulation of slow light in photonic crystals
	Busch, Kurt	Discontinuous Galerkin methods in nano-photonics
10:40 – 11:30	Coffee break	
11:30 – 12:40	**Session: Dynamics**	
	Tamura, Hiroyuki	**Exciton dynamics in molecular aggregates mediated by electron-phonon coupling**
	Kienle, Diego	Plasmon excitations at terahertz frequencies in carbon nanotube transistors
	Förstner, Jens	Simulation of the ultrafast nonlinear optical response of metallic nanostructures
12:40 – 13:30	Lunch	
13:30 – 15:30	**Session: Nanoparticles and Morphology**	
	Rühl, Eckart	Synthesis and characterization of nanoparticles for fundamental and applied research
	Eisele, Dörthe	Supramolecular origin and coupling of exciton transitions in highly uniform self-assembled double-walled dye nanotubes
	Mawatari, Kazuma	**Micro and nano chemical systems on microchip and coupling with optical near field**
	Meixner, Alfred	Nanometer scale optical imaging and spectroscopy: from molecular mono-layers to organic semiconductor
	Okamoto, Toshihiro	**Second harmonic generation due to field enhancement in gold dimer on KTP**

15:30 – 16:00 Coffee break / Poster A

16:00 – 17:40 **Session: Excitation transfer**

Tate, Naoya	**Hierarchy in nano-scale light matter interactions**
Axt, Vollrath Martin	Ultrafast dynamics and optical spin-control in single magnetic quantum dots
Da Como, Enrico	Carrier relaxation in a single flake of bi-layer graphene probed by ultrafast spectroscopy
Matsuda, Kazunari	**Novel excitonic properties of nano-carbon materials**

17:40 – 18:00 Short break

18:00 – 19:20 **Session: Material systems**

Kitamura, Kokoro	**Phonon-assisted visible light photocatalyst using ZnO nanostructure**
Sebald, Kathrin	Optical properties of wide-bandgap monolithic pillar microcavities
Koshida, Nobuyoshi	**Photonic and related functions of nanosilicon**

20:00 Conference Dinner

Tuesday, 28. September

08:30 – 10:30 **Session: Antennae and Networks**

Nomura, Wataru	**Long range optical excitation transfer based on optical near-field interactions between randomly distributed quantum dots**
Peschel, Ulf	Bringing light to the nanoworld using nanoantennas
Fischer, Ulrich	Antenna structures for near-field optics and near-field optical microscopy
Höppener, Christiane	Antenna-assisted fluorescence microscopy
Naruse, Makoto	**Energy dissipation in optical excitation transfer on the nano-scale: Its lower bound and optimal network for efficient transfer**

10:30 – 11:00 Coffee break / Poster B

11:00 – 12:20 **Session: Plasmonics I**

Hartschuh, Achim	Enhancing and localizing light-matter interactions using surface plasmons
Goncalves, Manuel	Field enhancements at triangular metal nanostructures and their application in enhanced Raman scattering
Zerulla, Dominic	Tailoring SPP propagation via topographic and magnetic nanostructures
Ropers, Claus	Strong-field effects in metallic nanostructures

12:20 – 12:30 Conference picture

12:30 – 13:00 Lunch

13:00 – 14:50 **Session: Technology**

Macro-Nano integration at the ZMN Technology Center of TU Ilmenau (10 min)

Yatsui, Takashi	**In situ real-time monitoring of changes in surface roughness during phonon-assisted optival near-field etching**
Polli, Dario	Nanoscale imaging of the interface dynamics in polymer blends by femtosecond pump-probe confocal microscopy
Wollenhaupt, Matthias	Shaped femtosecond laser pulses for nanoscale material processing and LIBS (laser-induced breakdown spectroscopy) detection
Miyazaki, Kenzou	**Nanostructure formation with periodically enhanced nearfield in femtosecond laser ablation**

15:00 Excursion to Weimar/Erfurt

Wednesday, 29. September

08:30 – 10:30 **Session: Plasmonics II**

Haraguchi, Masanobu	**Gap plasmon waveguide**
Eng, Lukas	Tuning plasmonic/photonic antenna structures for nanophotonic applications from visible to IR wavelengths
Hecht, Bert	Single crystalline gold nano structures for plasmonics
Rockstuhl, Carsten	Large scale simulations in the realm of nanophotonics
Saiki, Toshiharu	**Localized surface plasmon of Au nanoparticles on active nanostructured substrates with high refractive indices**

10:30 – 11:00 Coffee break

11:00 – 12:10 **Session: Control and logic elements**

Kawazoe, Tadashi	**Room temperature operated nanophotonic logic-gate using InAs QDs in mesa structures**
Pfeiffer, Walter	Ultrafast optical near-field control
Brixner, Tobias	Coherent two-dimensional nanoscopy

12:10 – 12:30 Closing Session

12:30 Lunch / Departure

15:00 Guided tour: Ilmenau (Japanese guests only)

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