International Workshop on Nonlinear Optics of Semiconductor Surfaces

September 22 - 25, 1996
Max-Planck-Institut für Quantenoptik, Garching/München, Germany
Organized by
T. F. Heinz*, U. Höfer and F. Rebentrost
Max-Planck-Institut für Quantenoptik in connection with
Sonderforschungsbereich 338 München, "Adsorption an Festkörperoberflächen:
Mikroskopische Analyse von Zuständen und Prozessen"

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Scope of the workshop:

During the past years second-harmonic generation and sum-frequency generation have been developed as highly effective probes of surfaces and interfaces of semiconductors. Applications of the method have expanded to include wide-ranging measurements such as the examination of chemical equilibria and adsorption, the determination of the diffusion rates of adsorbates at surfaces and carriers trapped at interfaces, the spectroscopy of surface and interfacial electronic transitions, the characterization of adsorbate vibrations, and pump-probe studies of ultrafast dynamics. At the same time, stimulated by the broader base of spectroscopic measurements and computational advances, the interest and activity in the elucidating underlying mechanisms of the nonlinear optical response at semiconductor surfaces and interfaces has increased. The workshop will provide a forum for discussion of the range of applications of the method to semiconductor surfaces and interfaces. Particular emphasis will be given to the commonality of the technique and the underlying theoretical issues.

Topics to be discussed:

- Microscopic theory of SHG/SFG from semiconductor surfaces

- Spectroscopy of clean surfaces
- Spectroscopy of solid/solid interfaces
- Real-time investigations of adsorbate dynamics
- Pump-Probe experiments
- Surface phase transitions
- Transient electric fields
- Application to vicinal surfaces
- Interfacial charge transfer and diffusion
- In-situ measurements of growth and chemical equilibria

Invited speakers:

O. Aktsipetrov (Moscow)	T. Suzuki (Riken)
W. Daum (Jülich)	H. Tom (Riverside)
V. Petrova-Koch (München)	H. van Driel (Toronto)
G. Lüpke (Aachen)	P. Vogl (München)
M. Mauerer (Garching)	D. von der Linde (Essen)
J. McGilp (Dublin)	A. Yodh (Philadelphia)
K. Pedersen (Aalborg)	C. Wijers (Enschede)
Th. Rasing (Nijmegen)	H. Zacharias (Essen)
G. Reider (Wien)	View a photo of all participants

Organizational Information:

The scientific sessions will be held in the lecture hall of the Max-Planck-Institut für Quantenoptik in Garching near Munich. Each talk should be 40 minutes including 10 minutes for discussion. The meeting will start with an informal dinner and welcome on Sunday, 22 September 1996, 19:00 in "Gasthaus Bürgerstuben", Bürgerplatz 9, Garching and end with lunch on Wednesday, 25 September 14:00, 1996. The Conference Dinner on Tuesday, 24 September 1996, 19:00, will take place in the Restaurant "Ratskeller" in the town hall of Munich, Marienplatz 8.

Accommodation during the meeting:

Hotel Maria	Phone: +49-89-3204041
Neufahrner Str. 5	Fax: +49-89-3206722
D-85748 Garching/München	

From Munich main station or from Munich international airport please take a taxi to the hotel. The city of Munich may also be reached by bus (290, 291, 691) and subway (U6) from Garching. The Max-Planck-Institut für Quantenoptik is withing walking distance (20 min). Please look at the map of Garching on the back cover of this program.

Scientific Program, Monday, 23 September 1996

Opening

08:30		Welcome and greetings
08:40	K. Kompa (Garching)	The Max-Planck Institute for Quantum Optics: Some comments on programs and perspectives

Session I: Semiconductor/oxide interfaces

(Session chair: U. Höfer)

09:10	O. Aktsipetrov (Moscow)	Second harmonic generation spectroscopy of Si(001)-based MOS structures and H-terminated Si(001) surfaces
09:50		*Coffee Break*
10:20	H. van Driel (Toronto)	SHG probing of charge transfer at the interface between silicon and thin oxide overlayers
11:00	G. Reider (Wien)	SH-response from the Si-SiO_2 interface under femtosecond-irradiation
11:40		*Break*
11:50	G. Lüpke (Aachen)	Nonlinear optical probing of static and high-frequency electric fields in silicon metal-(oxide)-semiconductor structures
12:30		*Lunch*

Session II: Studies of heterointerfaces

(Session chair: F. Rebentrost)

14:30	A. Yodh (Philadelphia)	Three-wave mixing spectroscopy of buried solid interfaces
15:10	W. Daum (Jülich)	SHG spectroscopy of Si heterostructure interfaces in the region of interband transitions
15:50		*Coffee Break*
16:20	H. Zacharias (Münster)	Measurement of the complex tensor components of [chi]^(2) at the diamond/silicon(100) interface

17:00	V. Petrova-Koch (TU München)	Multiphoton excitation of the photoluminescence in porous silicon
17:40		Session end

Scientific Program, Tuesday, 24 September 1996

Session III: Surface spectroscopy an theory

(Session chair: T. F. Heinz)

08:30	J. McGilp (Dublin)	Spectroscopic SHG from adlayers on stepped Si(001) surfaces
09:10	K. Pedersen (Aalborg)	SHG spectroscopy on Si(111)7x7
09:50		*Coffee Break*
10:20	F. Rebentrost (Garching)	Tight-binding model calculations of the nonlinear optical susceptibilities of the surfaces of silicon and diamond
11:00	C. Wijers (Enschede)	Discrete cellular methods: nonlocality in the theory of surface SHG
11:40		*Break*
11:50	P. Vogl (TU München)	Exact local exchange density functionals for semi-conductors
12:30		*Lunch*

Session IV: Surface dynamics

(Session chair: H. Zacharias)

14:30	T. Suzuki (Riken)	SHG study of the kinetics on Si(111): phase transition and oxidation
15:10	M. Mauerer (Garching)	Subpicosecond electron dynamics of excited dangling bond states of silicon
15:50		*Coffee Break*
16:20	U. Höfer (Garching)	Lab visit and poster session
19:00		*Conference Dinner*

Scientific Program, Wednesday, 25 September 1996

Session V: Ultrafst nonlinear spectroscopy

(Session chair: H. van Driel)

08:30	T. F. Heinz (New York)	Probing ultrafast electrical transients by SHG
09:10	D. von der Linde (Essen)	Ultrafast phase transitions probed by second harmonic generation
09:50		*Coffee Break*
10:20	H. Tom (Riverside)	Femtosecond SHG studies of coherent surface phonons on GaAs
11:00	Th. Rasing (Nijmegen)	Observation of coherent plasmon-surface phonon oscillations in GaAs/Au by time resolved SHG
11:40		*Break*
11:50		Discussion
13:00		*Lunch*
14:00		End of Conference

For further information please contact:

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