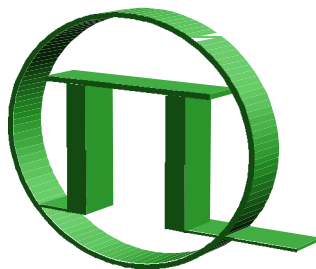


**6th International Workshop on
Single Molecule Detection
and Ultrasensitive Analysis
in Life Sciences**

Organized by
PicoQuant GmbH



PICOQUANT GmbH
Unternehmen für optoelektronische
Forschung und Entwicklung

Technical Program

27. September - 29. September 2000
at WISTA Campus
Berlin-Adlershof (Germany)

List of Sponsors

The workshop is sponsored by the following companies:

ATTO-TEC GmbH

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Aims and Purpose

The recent years have seen an ever increasing interest in the detection and spectroscopy of single molecules. Especially in genetic and biochemical screening and assaying, single molecule detection (SMD) under biologically native conditions became an important issue. The experimental method of choice in SMD is laser-induced fluorescence detection either on surfaces or SMD of freely moving molecules in liquids. In the first case, scanning techniques as Near-Field Scanning Microscopy or Confocal Scanning Microscopy, are the dominating techniques, although interesting results are emerging from the application of ultra-sensitive CCD camera systems. In the second case, the detection of single molecules in microdroplets, in flowing streams, and in (sub) picoliter detection volumes are the main approaches.

One of the most challenging topics in SMD is the application in fast DNA sequencing. There, the use of time-resolved techniques promises very compact systems capable of identifying the four nucleotides in a DNA-sequence according to their fluorescence lifetimes and spectra.

Already now, first applications have been reported from industry research groups concerning the use of SMD with picosecond diode laser systems. In the same context, two photon SMD has been reported using blue and green absorbing dyes as marker molecules. Similar techniques may prove very useful when incorporated into miniaturized systems for capillary electrophoresis, high density micro plate screening etc.

In the last couple of years, the annual Workshop on SMD, organized by PicoQuant in Berlin, has proven to be an excellent forum for the discussion of the topics mentioned above. The main goal is to give an overview of most recent results in the field and to stimulate new research and industrial applications. PicoQuant GmbH wants to encourage especially young scientists in SMD research. Therefore a special prize of 1500 DM is donated by the company for the "Students SMD Award 2000".

Venue

PicoQuant GmbH Berlin: Rudower Chaussee 29 (IGZ)
OWZ Building, Room 466
D-12489 Berlin

General Organization: Rainer Erdmann
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Registration office: WISTA Conference Center
Building 12.1
Einstein Kabinett
Wednesday 11.15 a.m. - 1.p.m.

Hotel address:
Transhotel
(new name Airporthotel) Radickestr. 76
(across the street Adlergestell)
D-12489 Berlin
phone: +49-30-67095-0
fax: +49-30-67095-222

Hints for Manuscript Preparation

All contributions to the Workshop will be considered for publication (peer reviewed) in upcoming issues of the journal *Single Molecule* (Wiley-Liss, edited by Prof. O. Greulich, IMB Jena).

The manuscripts should be prepared according to the Single Molecule Instructions to Contributors, available at:
<http://www.interscience.wiley.com>

Dead-line for submission of the manuscripts will be **November 01, 2000**. Please inform the organizing committee if you plan to submit your paper.

How to get to PicoQuant GmbH

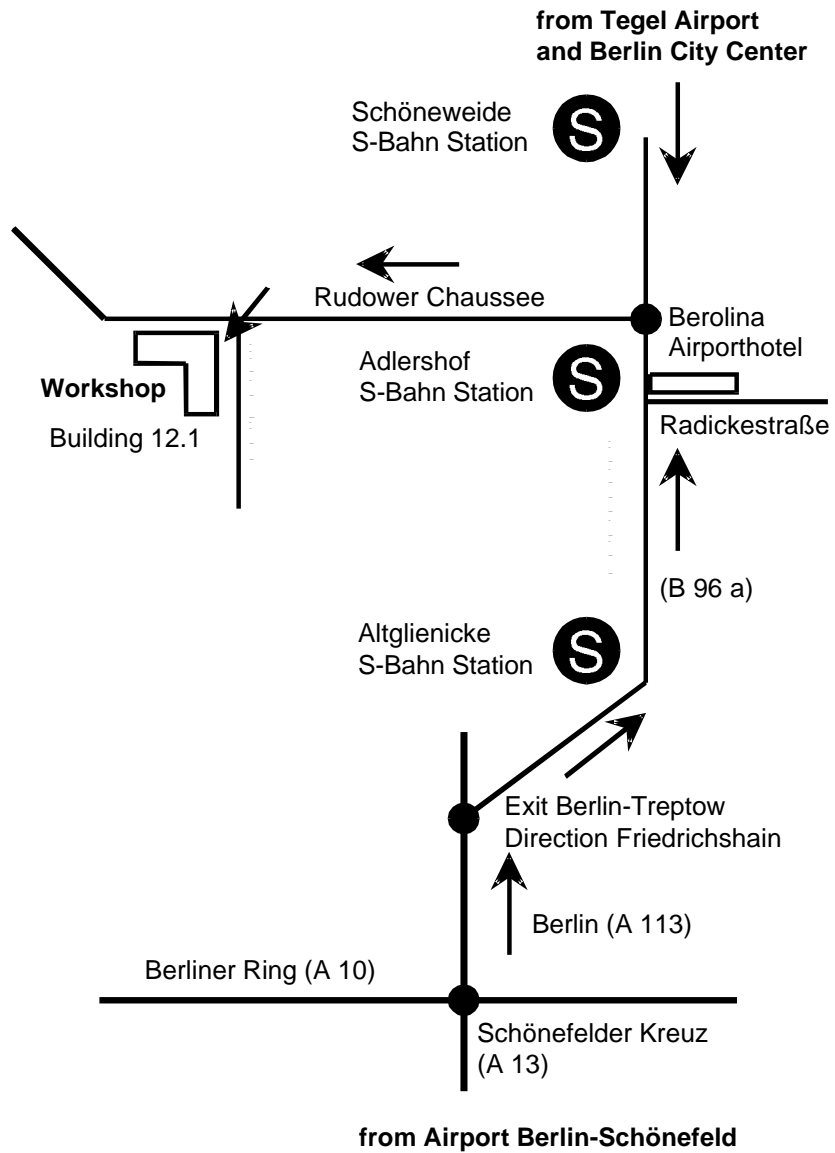
The workshop location is about 12min walking distance from the S-Bahn station **Adlershof**. Please go through the railway bridge and follow the Rudower Chaussee on the left hand side until you see the workshop signs. Then enter the building 12.1 at the WISTA campus and follow the signs.

from Airport/Railway station Berlin-Schönefeld:
take S-Bahn **S9** or **S45**, go three stops to **Adlershof**.
Ticket: Short-distance ticket (valid 3 stations, 2.50 DM)

from Railway station Zoologischer Garten:
take the S-Bahn into one of the following directions:
S9 or **S45** to Flughafen Berlin-Schönefeld
S8 to Grünau
S6 to Zeuthen or
S46 to Königs-Wusterhausen
and go to **Adlershof**.
Ticket: Single ticket, fare area AB (valid 2 hours , 4.00DM)

from Airport Berlin-Tegel:
take the Express Bus number **X9** to the railway station
Zoologischer Garten and follow the description given above.

Workshop Location



Program (subject to alterations)

Wednesday, 27 September 2000

11.15 - 13.00 Registration

13.15 - 13.30 R. Erdmann, Berlin

Opening Remarks

13.30 - 14.05 Sophie Brasselet, Stanford (**Invited Paper**)

Probing Ion Concentrations with Single Molecules

14.05 - 14.30 C. Hettich, Konstanz

Optical Microscopy with a Single-Molecule Light Source

14.30 - 14.55 Alonso Castro, Los Alamos

Single-Molecule Detection of Specific Nucleic Acid Sequences in Solution

14.55 - 15.20 Bürk Schäfer, Jena

Discrimination of Different Individual DNA Molecules by Single Molecule Restriction

15.20 - 15.55 **COFFEE BREAK**

15.55 - 16.30 Edward S. Yeung, Ames (**Invited Paper**)

High Throughput Single-Molecule Screening of DNA and Proteins

16.30 - 16.55 Cédric Begon, Marseille

Increasing Light Collection Efficiency in Ultrasensitive Fluorescence Analysis with Dielectric Mirrors and Microstructures

16.55 - 17.20 Werner Trabesinger, Zürich

Diagnostic Single-Molecule Binding Assays

17.20 - 17.45 Fedor Jelezko, Stuttgart

Single Molecule Spectroscopy on Photosynthetic Reaction Centers

17.45 - 18.10 Max Sonnleitner, Linz

Imaging Single Fluorescence Labeled Molecules in Living Cells Using two Photon Excitation

18.15 - 21.00 **RECEPTION**

Thursday, 28 September 2000

09.00 - 09.35 R. Rigler, Stockholm (**Invited paper**)
not available yet

09.35 - 10.00 Harri Härmä, Turku
Single-Molecule Detection of Prostate-Specific Antigen Using Time-Resolved Fluorescence

10.00 - 10.25 Anders Lundqvist, Göteborg
Towards Single Molecule Fluorescence Detection in Constricted Fused Silica Capillaries

10.25 - 11.00 **COFFEE BREAK**

11.00 - 11.35 Markus Sauer, Heidelberg (**Invited Paper**)
Fluorescence Lifetime Imaging of Single Molecules in Living Cells

11.35 - 12.00 S. Cova, Milano
Photon-Counting Microelectronic Detectors for DNA Separation in Capillary Electrophoresis

12.00 - 12.25 Jonas Korlach, Ithaca
A New Strategy for Sequencing Individual Molecules of DNA

12.25 - 12.50 Jerker Widengren, Göttingen
FRET Studies on Oligonucleotides by Ultrasensitive Multi-Dimensional Fluorescence Spectroscopy Techniques

12.50 - 13.15 G. Jung, München
Two-Color Fluorescence Correlation Spectroscopy: Investigation of Dark States in the Photophysics of Green Fluorescent Protein

13.15 - 14.15 **LUNCH**

14.15 - 17.30 **POSTER SESSION and PRODUCT PRESENTATION**

19.00 **DINNER**

Friday, 29. September 2000

09.00 - 09.35 Katrin Kneipp, Cambridge (**Invited Paper**)
**Linear and Nonlinear Raman Spectroscopy of Single Species
Attached to Silver and Gold Nanostructures**

09.35 - 10.00 Philip Tinnefeld, Heidelberg
**Photophysical Dynamics of Single Molecules Studied by Spectrally-
Resolved Fluorescence Lifetime Imaging Microscopy (FLIM)**

10.00 - 10.25 Samuel T. Hess, Ithaca
**Comparative Single Molecule Photophysics of Green Fluorescent
Proteins: Mutation Effects**

10.25 - 11.00 **COFFEE BREAK**

11.00 - 11.35 Manfred Auer, Wien (**Invited Paper**)
Confocal Fluorescence Detection in Solution- and Solid-Phase- μ HTS

11.35 - 12.00 Leif Brand, Hamburg
**Multidimensional Fluorescence Intensity Distribution Analysis: a
Powerful Tool in Fluorescence Evaluation**

12.00 - 12.25 Silvia Berger, Göttingen
**Primer/template Complexes of HIV-1 Reverse Transcriptase Studied
by Multi-parameter Fluorescence Spectroscopy**

12.25 - 12.50 Christian Hübner, Zürich
**Multi-Parametric Single-Molecule Fluorescence Detection and
Imaging with Slit Excitation**

12.50 - 13.50 **LUNCH**

13.50 - 14.25 Toshio Yanagida, Osaka (**Invited Paper**)
Single Molecule Dynamics in Bio-systems

14.25 - 14.50 Stephen Empedocles, Palo Alto
**Bioassays on the Single Copy Counting Level Using Highly
Fluorescent Semiconductor Quantum Dots**

14.50 - 15.15 Laurent Cognet, Leiden
In Vivo Single Molecule Imaging of Ca²⁺ Channels

15.15 - 15.40 Gerhard J. Schütz, Linz
3D-imaging of Single Molecules on Living Cells

15.40 - 16.10 COFFEE BREAK

16.10 - 16.45 Johan Hofkens, Leuven (**Invited Paper**)
**Probing of Photophysical Processes in Individual Multichromophoric
Dendrimers by Single Molecule Spectroscopy**

16.45 - 17.10 Kenneth D. Weston
**Single Molecule Fluorescence Detection Studies in Microfluidic
Channel Devices**

17.10 - 17.20 R. Erdmann, Berlin
Presentation of "SMD Students Award"

17.20 - 17.30 n.n.
Concluding Remarks

Call for Papers 2001

We would like to invite all participants of this meeting and all other interested scientists to the

7th International Workshop on Single Molecule Detection and Ultrasensitive Analysis

which will be held in Berlin in 26-28 September 2001. More information will be announced towards the end of this year on our web page

<http://www.picoquant.com>

We would like to invite people to submit their papers as soon as possible. From our experience organizing the previous meetings we recommend to do all correspondence by e-mail. Please send abstracts in RTF format or plain ASCII text in the same format like this book.