

CURRICULUM VITAE



Ahmed Abdelmonem

CONTACT

Address Albert-Einstein Str. 4
76344 Eggenstein-Leopoldshafen-Germany
Telephone +49 (0) 1799799584
E-mail ahmed.abdelmonem@kit.edu
www www.amamonem.de

EDUCATION

- Aug - Jul 2004 - 2008** **PhD in Applied Physical Chemistry**, University of Heidelberg (Germany).
"Nonlinear optical spectroscopy at the Liquid- / Solid- interface"
Full details and used techniques are in the attached appendix (II,III) to this CV
- Jul - Oct 1997 - 2000** **Master in Experimental Physics**, University of Cairo (Egypt).
"Investigation of Thermo-Optic Properties of a material to be used as Thermo-Optical Switching and Fiber Optics Sensor using Laser"
Details, used techniques and invented Sensor are in the attached appendix (IV) to this CV.
- Sep - May 1995 - 1996** **Diploma in Laser Material Processing and Industrial Applications**, National Institute of Laser Enhanced Science, University of Cairo (Egypt).
- Sep - May 1994 - 1995** **Pre-master in Experimental Physics**, University of Cairo (Egypt).
- Sep - May 1990 - 1994** **B.Sc. in Physics**, University of Cairo (Egypt).
As a part of my undergraduate degree I carried out a research project under the title "**Laser Material Processing**"

* During and between my PhD and Master I have also led seminars, supervised undergraduates in the laboratory, build setups, constructed home build laboratory devices and attended several workshops and conferences (See Appendix).

RESEARCH INTERESTS

My research interest centers around the climate and relevant environmental aerosol properties using the ice cloud simulation chamber (AIDA) and in-situ. I am interested in understanding the link between the microphysical properties of ice cloud particles and the radiative forcing of the clouds. I have several years of experience with technical issues in laser systems and experimental setups.

COURSES AND TRAINING

Jul 1993	18 Day	Training on optics fabrication and coating	ARAB INTERNATIONAL OPTICS Egypt
Sep 1997	12 Day	The international training course on Lasers and Applications in Industry, Medicine and Environment LAIME I	ICS – Tunis
Nov 1998	12 Day	Training course in Laser Science and its Applied Technologies	National Institute of Laser Enhanced Science – Uni. of Cairo - Egypt
Oct 2003	3 Days	Training course on Photoenergy Applications in the Environment	Photoenergy Centre – Faculty of Science – University of Ainsams - Egypt

EMPLOYMENT

- Jun 2008** - **present** **Post Doc** in the "Institute of Meteorology and Climate Research (IMK-AAF FZK)", Karlsruhe - Germany
Project details and responsibilities → appendix (I) or www.amamonem.de
- Aug 2005** - **Jun 2008** **Researcher** in the "Institute of Nuclear wastes Disposal, Karlsruhe research Center (INE-FZK)", Karlsruhe - Germany
Full details and used techniques are in the attached appendix (II) to this CV
- Jul 2004** - **Aug 2005** **Researcher** in the "Institute of Applied Physical Chemistry (APC)", University of Heidelberg – Germany
Full details and used techniques are in the attached appendix (III) to this CV
- Jan 2002** - **Jul 2004** **Assistant Lecturer** in the "National Institute of Laser Enhanced Science (NILES)", University of Cairo (Egypt).
Full details and used techniques are in the attached appendix (IV) to this CV
- Sep 1994** - **Jan 2002** **Researcher** in the, "National Institute of Laser Enhanced Science (NILES)", University of Cairo (Egypt).
Full details and used techniques are in the attached appendix (IV) to this CV

TECHNICAL EXPERIENCE

One of the research objectives of my Ph.D. project was to understand the adsorption mechanism of Hydrocarbons on sapphire surface from aquatic solution as a model system analogous to the adsorption of Humic substances on minerals in soil which in turn describes the migration of nuclear wastes in human resources. Another part was to diagnose the Surface Functionalization results from the adsorption of Self Assembled Monolayer SAM on metal surfaces and the potential of utilizing the generated surface properties in new technologies like the micro-fluidic channel.

A wide range of analytical techniques were employed for the characterization of the prepared materials and monitoring the adsorption mechanism (e.g. XPS, ATR, FTIR, Contact Angle, Ellipsometry, SHG, S-SFG, BB-SFG ...).

Some of these Experiments I have build my self under the supervision of Dr. M Himmelhaus* :

1. **Simultaneous Ellipsometry-SHG System** and we were pioneers in publishing this novel technique and some of it's results in the **DPG Spring Meeting 2006 (Dresden German)**
2. **Real-Time Time-Resolved/Frequency-resolved BB-SFG** and we were pioneers in publishing this new developed option in the technique and some of it's results in the **IMS symposium 2006 (Japan)**
3. Home made **Contact Angle System**.

SKILLS

Computing Skills

- I am familiar with the use of a number of word processing and data manipulation programs including MS Word, MS Excel, MS Power Point, MS Access, Corel Designer, Adobe Photo Shop, Paint-shop Pro, Photo Express, Harvard Graphics, **Autodesk2008**, Origin, Gnuplot, **Labview**, Maxima (Math.) and Web designing using Front Page and **RedDot**†.
- I have experience in computer hardware maintenance and a humble experience in networks.

* Michael.Himmelhaus@urz.uni-heidelberg.de

† I am a member of the IMK-AAF website designers and thereby the editor of the "Instrument development" page.

Technical Skills

- I am familiar with the working tools used for machinery. I used to design and construct the simple mounts and holders required for the optical setups, (see [www](#)).
- My private hobby is electronics and simple circuits design. This has distinguished me in my working group where I was able to fix some circuit failures in the laser system and designing drivers for stepper-motors and shutters (see [www](#)). Circuit Maker Software is my favorable software to design and test circuits before construction.

Teaching Skills

- Have lead several seminars for under- and post-graduates in the National Institute of Laser Enhanced Science
- Partially supervised a Diploma Work done on the lasing from Microparticles and Whispering Gallery Modes, (Building up the used setup), in the institute of Applied physical chemistry- University of Heidelberg, (see [www](#)).

Language Skills

- English V. Good
- German Good

References

Name	Michael Himmelhaus	Horst Geckeis	Reinhard Klenze
Position	Research Director	Institute Leader	Group leader
Type	PhD Supervisor	Employer	Employer
Address	51, Komiya-cho, Hachioji-shi - TOKYO 192-0031, JAPAN	Forschungszentrum Karlsruhe - Postfach 3640 - D-76021 Karlsruhe	Forschungszentrum Karlsruhe - Postfach 3640 - D-76021 Karlsruhe
Tel.	: 0081 426 45 4774	0049/(0)7247/82-4992	0049/(0)7247/82-4602
Fax	: 0081 426 46 8325	0049/(0)7247/82-4308	0049/(0)7247/82-4308
Email	: Michael.Himmelhaus@urz.uni-heidelberg.de	geckeis@ine.fzk.de	klenze@ine.fzk.de

APPENDIX

I. Jun/2008 -Present:

Institute of Meteorology and Climate Research

Atmospheric Aerosol Research

Karlsruhe Research Center- Germany

Cirrus clouds impact climate by their influence on the water vapor distribution in the upper troposphere. Moreover, they directly affect the radiative balance of the Earth's atmosphere by the scattering of incoming solar radiation and the absorption of outgoing thermal emission. The link between the microphysical properties of ice cloud particles and the radiative forcing of the clouds is not as yet well understood and the influence of the shapes of ice crystals on the radiative budget of cirrus clouds is currently under debate.

Missions:

Together with M. Schnaiter

Development of a new experimental device for imaging individual ice crystals and measuring simultaneously the scattering phase function of the same crystal (Particle Habit Imaging and Polar Scattering Probe, PHIPS). The scattering part of the device will measure the scattering phase function at 532 nm and with an angular resolution of about 8 degree. Since large ice crystals tend to scatter in near-forward direction efforts are made to enhance the angular resolution in this region

The plan is to produce two version if the PHIPS;

1. A Laboratory version to detect ice particles generated in the **AIDA** and travels through the PHIPS-Lab with a velocity of ~2m/s. Electrical connections are required and a complete software package for driving the instrument and performing the data analysis should be written.
2. An aircraft (**HALO**) compact version to detect the ice particles at high altitudes travels through the PHIPS-HALO with a velocity of ~200m/s

Progress and status (from Jun/2008 to Jun/2009): → (<http://www.amamonem.de/IMK.htm>)

1. PHIPS-Lab

The PHIPS-Lab is completed and tested in the ice cloud characterization campaign HALO-02 which was conducted in December 2008 at the AIDA cloud chamber and showed honor results. (Part of these results were published in EGO2009 and another part is being prepared to be published in ECA2009)

2. PHIPS-HALO

A CAD version of the **PHIPS-HALO** optical part is done. Some components were ordered or constructed

In addition to the scientific missions and participating in the AIDA activities, I am the editor of the "Instrument Development" webpage as a member the IMK-AAF website designers.

II. Aug/2005 – Jun/2008:

Institut für Nukleare Entsorgung INE , Forschungszentrum Karlsruhe FZK – Deutschland

The major part of my PhD, “Nonlinear optical spectroscopy at the Liquid- / Solid- interface”, experimental work has been carried in the INE. Adsorption of organic compounds from gas and liquid phases to solid surfaces is important for technical and environmental science. Technical and environmental issues require a good understanding of the interaction of organics with mineral surfaces, particularly on the molecular level. The aim of the work was to study the interaction between the Sapphire and simple organic molecules. A copy from the Dissertation can be downloaded from www.amamonem.de

I present here the activities and experiments I have done since I joined INE in Aug 2005. There were a lot of important experiments and result analysis which needed to be performed before starting accumulating new results for my PhD thesis. Some difficulties and Laser system troubles should have been solved to be able to do good work:

1. Scientific Cooperation:

- Cooperation with the *INE- nonlinear spectroscopy group* in curve fitting and results discussions concerning their old results from *SFG at sapphire/electrolyte interfaces*.
- Collecting and reading articles related to this field
- Business travels to the “Rossendorf Research Centre (FZR)” in Dresden-Germany for measurement times. (*SFG at sapphire/water interface between 750 and 950 cm⁻¹ using the Free Electron Laser*)
- Cooperation in the setup, experiments, analysis and discussions of *SFG at water/sapphire interface at different pH values*.

2. Technical contribution to the laser‡ system quality:

- Investigating the influence of the humidity and temperature on the Laser operation.
- Improving the laser electric connections and maintaining the cooling cycle.
- Working on the Laser stability diagnostic in the laser oscillator and amplifier.
- Recognizing and overcoming the reasons which make the laser unstable and season sensitive
- Determining the origin of non-reproducible spectra given some times by the spectrometer systems which uses the OPO technique. This non-reproducibility could be attributed erroneously to the physical and chemical properties under investigation. This has been achieved by improving the operation of the OPO using computer controlled moving stages at the end mirror of the OPO and at the delay unit.

3. Building a contact angle measurement system (see www)

4. Techniques used in the INE part of my PhD:

- Polarization dependent IR and SFG spectra at liquid and vapor/sapphire interfaces in Total Internal Reflection (TIR) configuration have been gathered using mode-locked pulsed Nd:YAG laser system with tunable IR produced by Optical Parametric Oscillator (OPO).
- XPS, Optical Microscope and Contact Angle was used for the characterization of sample preparation and cleaning

‡ Mode-locked Nd:YAG ps-Laser coupled to OPO unit.

III. Jul/2004 - Aug/2005:

Angewandte Physikalische Chemie, APC, Uni-Heidelberg - Deutschland

1. A lot of theoretical and experimental work has been done to evaluate the adsorption rate and layer thickness of Self Assembled Mono layers (SAM). However measurements of the adsorption kinetics have been found to depend on the transducer mechanism used to trace the adsorption process. My mission was to develop a novel approach to combine linear and nonlinear techniques (Ellipsometry and SHG) to monitor the layer thickness and the surface coverage respectively simultaneously, (see [www](#)). The setup has been used to produce correlated coverage/thickness data of some Alkanethiols adsorbed on Gold Surface, (see publications).

2. Another mission was to develop a Broad Band femtosecond system to be a Real-time Spatial and Temporal Resolved Sum Frequency Generation System. The setup has been constructed and tested (see publications).

1. The activities and cooperation I did beside my PhD work:

1. Full filling the requirements for the PhD registration, (Physical Chemistry courses PC-I and PC-II), and I have passed them with 1.0 and 1.5 respectively.
2. Reviving an old Nd:YAG Laser and improving its optical power stability.
3. Partially supervising a Diploma work done on the lasing from Microparticles and Whispering Gallery Modes .Building up the used setup, (see [www](#)).

2. Techniques used in the APC part of my PhD:

- Nd:YAG ps Laser for the SHG experiments.
 - Ellipsometry
 - Diode pumped Ti:Sapphire fs-Laser for the Real-time time resolved BB-SFG.
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- Two papers out of this work have been published in the "Spring-Meeting of German Physical Society" Mar/2006 (see VI. Publications)
 - One paper has been published in the IMS symposium "Frontier of Molecular Science Explored by Sum-Frequency Spectroscopy", Okazaki Conference Center, Japan (see VI. Publications)

All these tasks have been done in APC-Uni. of Heidelberg under the Supervision of:

Michael Himmelhaus

E-Mail: Michael.Himmelhaus@urz.uni-heidelberg.de

Angewandte Physikalische Chemie

IV.Sep/1994 -Jul/2004:

National Institute of Laser Enhanced Science (NILES) University of Cairo - Egypt

Synchronized with my scientific career birth was the nativity of NILES (~1995). NILES was the institute which has been build by the young scientists' arms. Young researchers at that time lost a lot of time, used by others to build their career somewhere else, but they collected a wide range of experiences in building systems their selves and establishing new laboratories. NILES was a multidisciplinary institute and since every one was engaged in several tasks simultaneously where building the setups and the experiments was our responsibility, we have been trained to be self sustaining scientists and acquired a wide range of experiences in Lasers and their applications in numerous fields.

My Master thesis "INVESTIGATION OF THERMO-OPTIC PROPERTIES OF a MATERIAL TO BE USED AS THERMO-OPTICAL SWITCHING AND FIBER OPTICS SENSOR USING LASER" was a little bit a cocktail of scientific interests. The main objective was to handle and practice some of the new installed systems in NILES and utilize them in new research.

1. Experiences and used techniques NILES before during and after my Master:

- Optical fiber applications in communication (teaching) and sensors (Master).
- Studying the thermo-optical properties of some materials required for sensors design using optical fibers coupled to laser diodes (Master).
- Experiments on low temperature (liquid nitrogen) autofluorescence from semiconductors using Argon-Ion Laser (Cooperation).
- IR Absorption for γ - irradiated paraffin wax (Master)
- Raman spectroscopy (Master).
- Using and operating the following systems:
 1. CW - Argon Ion laser.
 2. Pulsed ns Nd:YAG laser (Master).
 3. Diode Lasers (Master).
 4. Optical Microscope.
 5. Raman system.
 6. IR Spectrophotometer
- Participating by two papers in the 2nd Euro-Mediterranean Conference on Application of Photobiology and Laser Technologies in Medicine and Environment, Cairo, 1998.
- Participating in NILES1 (1996), NILES2 (1998), and NILES3 (2000) conferences.
- Participating by one paper in the EMSLIBS CONFERENCE, Cairo, 2001
- Working on an interesting project under the title "PHOTONIC EXPLOITATION OF NANOPARTICLES IN POLLUTION PREVENTION AND WATER DISINFECTIO". (see [www](#))

2. Model Systems designed by me:

1. A thermo-optical sensor immune from electromagnetic fields and HT which can be used in remote sensing and optical switching (see [www](#)).
2. An experiment for students to demonstrates the use of Diode Lasers and fiber optics in communication, by transporting sound through air or fibers. (Including the receiver and transmitter circuit design) (see [www](#))

IV. List of publications:

1. Thermo- Optical Properties using Optical Fiber Coupled to Laser Diode

Gamal Abdel Fattah A.ABD EL-MONEM and Y. A. BADR

International Conference , Laser & Applications, Advances in Sciences, Medicin, and Technology NILES 1996 Cairo

2. Wax-Oil Complex Thermo-Optical Switching and IR Absorption

Gamal Abdel Fattah, A.ABD EL-MONEM and Y.A. BADER

2nd Euro-Mediterranean Conference On Application of Photobiology and Laser Technologies in Medicine & Environment (Cairo, February 13-16,1998)

3. Nanoscale Flow-Cells and their Application

Tilmann Rogge¹, Kristin Mandisloh¹, Timo Mappes¹, Martina Schürmann², Axel Rosenhahn², Ahmed Abdelmonem², and Michael Himmelhaus²

¹ Institut für Mikrostrukturtechnik, Forschungszentrum Karlsruhe, 76021 Karlsruhe

² Angewandte Physikalische Chemie, Universität Heidelberg, 69120 Heidelberg

DPG Spring Meeting of the Division Condensed Matter, 21st General Conf. of the Condensed Matter Division of the European Physical Society, Dresden, March 26-31, 2006 Verhandlungen der Deutschen Physikalischen Gesellschaft, R.6, B.41(2006) CPP 24.12.

4. Experimental determination of the coverage-height dependence of self-assembled monolayers during film formation

Ahmed Abd el Monem¹, Jana Wehrmeister², Mark Helm², and Michael Himmelhaus¹

¹ Angewandte Physikalische Chemie, Universität Heidelberg, Im Neuenheimer Feld 253, 69120 Heidelberg

² Institut für Pharmazie und molekulare Biotechnologie, Universität Heidelberg, Im Neuenheimer Feld 364, 69120 Heidelberg

DPG Spring Meeting of the Division Condensed Matter, 21st General Conf. of the Condensed Matter Division of the European Physical Society, Dresden, March 26-31, 2006 Verhandlungen der Deutschen Physikalischen Gesellschaft, R.6, B.41(2006) CPP 17.6.

5. An Approach to Real-Time Time-Resolved Sum Frequency Generation Using A Broadband Femtosecond Laser Source

Ahmed Abd el Monem, Michael Himmelhaus (invited)

IMS symposium "Frontier of Molecular Science Explored by Sum-Frequency Spectroscopy", Okazaki Conference Center, Japan, Dec. 5-6th 2006

6. UNDERSTANDING MINERAL/WATER INTERACTION AT THE MOLECULAR LEVEL BY MEANS OF NONLINEAR OPTICS AND QUANTUM CHEMISTRY

M. Flörsheimer, K. Kruse, R. Polly, A. Abdelmonem, B. Schimmelpfennig, R. Klenze, Th. Fanghänel, (Germany)

MIGRATION '07 (München, Germany)

7. QUANTUM CHEMICAL DESCRIPTION OF THE INTERACTION OF WATER AND METAL IONS WITH THE SAPPHIRE (001) SURFACE USING CLUSTER MODELS

R. Polly, M. Flörsheimer, K. Kruse, A. Abdelmonem, B. Schimmelpfennig, R. Klenze, Th. Fanghänel, (Germany, EU)

MIGRATION '07 (München, Germany)

8. The Functional Species of a Mineral Surface and their Interaction with the Adjacent Water Molecules - Determined by Nonlinear Optics and Quantum Chemistry

Flörsheimer M, Kruse K, Polly R, Abdelmonem A, Schimmelpfennig B, Klenze R & Fanghänel T

Goldschmidt 2007 - "atoms to planets" August 19 - 24, 2007 (A287) Cologne, Germany

9. Coupling linear and nonlinear spectroscopic techniques to precise the interpretations on the molecular level: A Preliminary model for the interaction at aquatic Butanol/Sapphire - 001 interface

Ahmed AbdelMonem^{[1][2]}, Johannes Lützenkirchen^[2], Horst Geckels^[2], Reinhardt Klenze^[2], and Michael Himmelhaus^[2]

[1] Corresponding author: ahmed.abdelmonem@kit.edu *, [2] Institute for nuclear wastes disposal (INE), Karlsruhe research Center (FZK)-

Germany, [3] Fujirebio, Inc., Hachioji-shi, Japan, * Current address: Institute for Meteorology and Climate - Atmospheric Aerosol Research (IMK-AAF), Karlsruhe research Center (FZK)- Germany

6th German - Brazilian Workshop on Applied Surface Science 14-19/Sep/2008

10. Hydration of Mineral Surfaces Probed at the Molecular Level

Mathias Flörsheimer, Klaus Kruse, Robert Polly, Ahmed Abdelmonem, Bernd Schimmelpfennig, Reinhardt Klenze, and Thomas Fanghänel

Web Release Date: 04-Nov-2008; (Research Article) DOI: 10.1021/la801677y

11. Theoretical investigation of the water/corundum (0001) interface

Robert Polly,^{1,a},^b Bernd Schimmelpfennig,¹ Mathias Flörsheimer,^{1,2,b} Klaus Kruse,^{1,c} Ahmed AbdelMonem,^{1,d} Reinhardt Klenze,¹ Guntram Rauhut,³ and Thomas Fanghänel^{2,4}

¹Institut für Nukleare Entsorgung, Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe, Germany ²Physikalisch-Chemisches Institut,

Ruprecht-Karls Universität Heidelberg, 69120 Heidelberg, Germany ³Institut für Theoretische Chemie, Universität Stuttgart, Pfaffenwaldring 55,

70569 Stuttgart, Germany ⁴European Commission, Joint Research Center, Institute for Transuranium Elements, 76344 Eggenstein-Leopoldshafen,

Germany

The Journal Of Chemical Physics 130, 064702 _2009_

12. The Particle Habit Imaging and Polar Scattering probe PHIPS: First Stereo-Imaging and Polar Scattering Function Measurements of Ice Particles

A. ABDELMONEM, M. Schnaiter, R. Schön, and T. Leisner

European Geosciences Union, General Assembly 2009, Vienna, Austria, 19 – 24 April 2009, AS3.13, Thursday, 23 Apr 2009, Halls X/Y

13. The Backscattering Linear Depolarization Ratio of Ice Clouds Composed of Small Ice Crystals

M. Schnaiter, A. ABDELMONEM, S. Benz, T. Leisner, O. Möhler, and R. Wagner

European Geosciences Union, General Assembly 2009, Vienna, Austria, 19 – 24 April 2009, AS3.13, Thursday, 23 Apr 2009, Halls X/Y

14. Laboratory and Cloud Chamber Studies of Formation Processes and Properties of Atmospheric Ice Particles (solicited)

T. Leisner, A. ABDELMONEM, S. Benz, M. Brinkmann, O. Möhler, D. Rzesanke, H. Saathoff, M. Schnaiter, and R. Wagner

European Geosciences Union, General Assembly 2009, Vienna, Austria, 19 – 24 April 2009, AS3.13, Thursday, 23 Apr 2009, Room 1

15. An attempt to explain bimodal behaviour of the sapphire c-plane electrolyte interface

J. Lützenkirchen, R. Zimmermann, T. Preočanin, A. Filby, T. Kupcik, D. Küttner, A. Abdelmonem, D. Schild, T. Rabung, M. Plaschke, F. Brandenstein, C. Werner, H. Geckeis

Advances in Colloid and Interface Science