

Proceedings of the
WELCOME
Scientific Meeting on Hybrid Nanostructures
Toruń, Poland, August 28–31, 2011

Editor of the Proceedings:

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WARSAW

POLISH ACADEMY OF SCIENCES
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Keynote speakers and titles of their presentations:

Gerd Bacher — *Optical Spectroscopy on Nanostructured Spin-Hybrids*
Marc Brecht — *Nanoparticles Affect the Function of Photosystem I*
Garnett Bryant — *Hybrid Quantum Dot-Metal Nanoparticle Systems: Connecting the Dots*
Leonor Chico — *Electronic Transport through Bilayer Graphene Flakes*
Raoul Frese — *Translating Photosynthesis onto Gold Electrodes*
Wolfgang Heiss — *Metallic and Semiconductor Colloidal Nanocrystals with Specific Functionalities*
John Kelly — *Triangular Silver Nanoparticles: Their Preparation, Functionalization and Properties*
Francois Peeters — *Self-Assembled Free-Standing Semiconductor Nanowires: Doping, Stability and Core-Shell Structures*
Hugo Scheer — *Light-Reactions in Natural Photosynthesis*
Leigh Smith — *Measuring the Electronic Properties of Single Semiconductor Nanowire Heterostructures Using Advanced Optical Spectroscopies*
Val Zwiller — *Interfacing Quantum Dots with Atomic Vapors*

Invited speakers and titles of their presentations:

Andres Ayuela — *Edge States and Flat Bands in Graphene Nanoribbons with Arbitrary Geometries*
Sebastian Beyer — *Photonic Structures for Fluorescence Enhancement of Pigment-Protein-Complexes: A Single Molecule Study*
Fernando Delgado — *Controlling the State of a Single Magnetic Atom with Electric Current*
Leszek Fiedor — *Controlling Photosynthetic Antenna Assembly and Functioning via Cofactor Exchange*
Krzysztof Gibasiewicz — *Modulation of Intraprotein Electron Transfer Rate in Bacterial Reaction Centers*
Mateusz Goryca — *Spectroscopy of Semiconductor Quantum Dots with Single Magnetic Ions*
Jaroslaw Grobelny — *Nanoscale Metrology — Key Process in Application of Nanoobjects*
Joanna Grzyb — *Protein Maquettes — Tools to Study Electron Transfer*
Paweł Machnikowski — *Collective Luminescence from Arrays and Ensembles of Quantum Dots*
Piotr Nyga — *Submicrometer Silica Particles with Plasmonic Shells*
Bartłomiej Szafran — *Scanning Gate Microscopy Simulations for Quantum Rings*
Mariusz Zdrojek — *Novel Approach for Energy Spectrum Probing in Nanostructures*
Michał Zieliński — *Atomistic Theory of Exciton Fine Structure Splitting in Self-Assembled Quantum Dots*

Preface

The present volume of *Acta Physica Polonica A* contains a selection of papers presented during the WELCOME Scientific Meeting on Hybrid Nanostructures, which was held in Torun from August 28 till 31, 2011. This meeting, organized by the Institute of Physics, Nicolaus Copernicus University, brought together over 50 scientists and students from European and American universities and research institutes as well as from Polish scientific centers.

Hybrid nanostructures have become in recent years a very vibrant field of research, where scientists of various disciplines join efforts in order to understand the complexity of interactions at the nanoscale and try to control as well as exploit them. The focus of the WELCOME Scientific Meeting on Hybrid Nanostructures was to present and discuss advances in such diverse areas as photosynthesis, plasmonics, semiconductor spectroscopy, colloidal chemistry, biochemistry, theory of nanostructures, that are aimed altogether at achieving high level of nanostructure manipulation. As the Editor of the volume I believe that it presents an interesting overview of all the currently studied aspects in respective research fields. On behalf of the Organizing Committee I would like to thank all the authors that contribute to the proceedings. We appreciate financial support from the WELCOME project "Hybrid Nanostructures as a Stepping Stone Towards Efficient Artificial Photosynthesis" awarded by the Foundation for Polish Science, that helped us to organize this unique event. We would like to thank Prof. Witold Dobrowolski, the Editor-in-Chief of *Acta Physica Polonica A*, for a possibility to include selected papers from the symposium in this journal.

Editor of the Proceedings
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