

# Higher Education

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## DIPC School

### Nanotechnology meets Quantum Information - NanoQI

July 11-14, 2016

Miramar Palace, Donostia / San Sebastián

<http://nanoqi.dipc.org/>

#### Organizing Committee

J. Ignacio Cirac (MPQ Garching, Germany)

Geza Giedke (Ikerbasque, DIPC)

Alejandro González-Tudela

Ataç Imamoglu

Mikhail Lukin

Ever smaller and better designed structures for sensing and computing are reaching the quantum realm, leading to new promises and challenges in information processing. The school "Nanotechnology meets Quantum Information" aimed to provide a broad overview of different implementations of quantum information processing and quantum simulation enabled by recent progress in nanotechnologies.

Seven leading experts reviewed the experimental and theoretical state-of-the-art for some of the most promising implementations such as semiconductor quantum dots, superconducting circuits, defect centers in diamond, photonic crystal structures, and topological insulators and explored the prospects of quantum computing, quantum simulation, and the physics of quantum many-body systems.

#### Invited Speakers

Darrick E. Chang (ICFO Barcelona, Spain)

J. Ignacio Cirac (MPQ Garching, Germany)

Liang Fu (MIT Cambridge, USA)

Ataç Imamoglu (ETH Zurich, Switzerland)

Daniel Loss (University of Basel, Switzerland)

Mikhail D. Lukin (Harvard University, Cambridge, USA)

Andreas Wallraff (ETH Zurich, Switzerland)



## DIPC School

### Topological Matter School 2016

August 22-26, 2016

Miramar Palace, Donostia / San Sebastián

<https://tms16.sciencesconf.org/>

#### Organizing Committee

Dario Bercioux (Ikerbasque, DIPC)

M. Reyes Calvo (CIC nanoGUNE)

Maia G. Vergniory (DIPC)

François Konshelle (CFM (CSIC-UPV/EHU))

Topological states of matter consist in new platforms where quantum mechanics realizes at a mesoscopic scale. This emerging topic grew up impressively in the last few years: a few problems have been resolved (as the classification of non-interacting systems) whereas many more are still open questions.

The aim of this one week school was to introduce students to the recently developed field of topological states of matter. The main goal was to cover basic and advanced aspects of the field, including a set of lectures explaining practically how to perform a first principle approach to the problem.

#### Invited Speakers

Alexander Altland (University of Cologne)

Mois Aroyo (UPV/EHU Bilbao)

Andrei Bernevig (Princeton University)

Claudia Felser (Max Planck Dresden)

Titus Neupert (University Zürich)

Alexey Soluyanov (ETH Zürich)

Ivo Souza (CFM,UPV/EHU Donostia / San Sebastián)

Binghai Yan (Max Planck Dresden)



## DIPC School

### Dynapeutics

September 25-30, 2016

Miramar Palace, Donostia / San Sebastián

<http://dynapeutics.dipc.org/speakers>

#### Scientific Committee

Emanuele Paci (University of Leeds, UK)

Annick Dejaegere (Institut de Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France)

Roland H. Stote (Institut de Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France)

Michael Schaefer (Novartis Pharma AG)

Olivier Michelin (Université de Lausanne, Switzerland)

Vincent Zoete (Université de Lausanne, Switzerland)

Nathalie Reuter (University of Bergen, Norway)

Lennart Nilson (Karolinska Institutet, Stockholm, Sweden)

Thomas Simonson (Ecole Polytechnique, Paris, France)

Stefan Boresch (University of Vienna, Austria)

Darrin M. York (Rutgers University, New Jersey, USA)

#### Organizing Committee

Prof. Xabier Lopez (UPV/EHU, DIPC)

Dr. Jon I. Mujika (UPV/EHU, DIPC)

Dr. Elixabete Rezabal (UPV/EHU, DIPC)

Dr. Eider San Sebastian (UPV/EHU)

Dr. Elena Formoso (UPV/EHU, DIPC)

Dr. Rafael Grande-Aztatzi

Dr. Jose M. Mercero

DYNAPEUTICS international summer school aimed to introduce, describe and discuss the theory and applications of computational methods for the study of biological molecules, relevant for the understanding of design and optimization of molecular drugs, and for the understanding of biological processes in general at the molecular level. The school was taught at the postgraduate level and was addressed to PhD students and postdoctoral researchers with a solid background in biophysics.

The course consisted of several seminars and computation training that covered the main concepts introduced in the seminars. The school was part of a wider initiative "Passion For Knowledge" that attracted leading scientists from around the world to San Sebastian to share their research experience, like Nobel Laureate Prof. Martin Karplus. Hence, the participants also benefited from an outstanding atmosphere and social activities around the school that emphasized the links between science and society, in its most general sense.

Subjects covered in the school:

- Force fields
- Simulation methods overview
- Molecular Dynamics and Monte Carlo Methods
- Normal Mode Analysis
- Accelerated dynamics

- Free energy Calculations
- Continuum electrostatics
- Homology modeling
- Docking
- Drug design
- Quantum Chemistry and QM/MM methods

#### Invited Speakers

Martin Karplus (Harvard University and Université de Strasbourg)

Emanuele Paci (University of Leeds, UK)

Annick Dejaegere (Univ. of Strasbourg, France)

Roland H. Stote (Univ. of Strasbourg, France)

Michael Schaefer (Novartis Pharma AG, Switzerland)

Olivier Michelin (Swiss Institute of Bioinformatics, Switzerland)

Vincent Zoete (Swiss Institute of Bioinformatics, Switzerland)

Antoine Daina (Swiss Institute of Bioinformatics, Switzerland)

Nathalie Reuter (Univ. of Bergen, Norway)

Lennart Nilson (Karolinska Institutet, Stockholm, Sweden)

Leif A. Eriksson (Göteborgs Universitet, Göteborg, Sweden)

Ronen Zangi (Univ. of the Basque Country, Spain)

Stefan Boresch (Univ. of Vienna, Austria)

Darrin M. York (Rutgers University, New Jersey, USA)

Markus Meuwly (Univ. of Basel, Switzerland)

Jon I. Mujika (Univ. of the Basque Country, Spain)

Ferran Feixas (Univ. de Girona, Girona, Spain)

Pedro A. Fernandes (Univ. of Porto, Porto, Portugal)



## Theses

Size-dependent electronic properties of metal nanoparticles.

**Marina Quijada Van der Berghe**

January 2016

Supervisors: Ricardo Díez Muiño and Pedro Miguel Echenique

Classical and quantum approaches to the interaction of light and matter at the nanoscale.

**Mikolaj Kajetan Schmidt**

January 2016

Supervisor: Javier Aizpurua

Electron dynamics in the interaction of atomic particles with spherical metal clusters.

**Natalia Koval**

April de 2016

Supervisor: Daniel Sanchez Portal

Phonon and electron excitations in abstraction processes from metallic surfaces.

**Oihana Galparsoro Larraz**

December 2016

Supervisors: Maite Alducin (UPV/EHU) and Pascal Larregaray (Université de Bordeaux)

Elementary reactive processes of nitrogen and hydrogen on metal surfaces: a theoretical study.

**Mohamed Ahmed Mohamed Abdelazim Nosir**

December 2016

Supervisor: Ricardo Díez Muiño

## Master's Degree Program

### UPV/EHU Research Master's in Nanoscience

DIPC collaborates in the official postgraduate program in nanoscience organized by the Materials Physics Department of the University of the Basque Country (UPV/EHU) and the Center of Materials Physics (CSIC-UPV/EHU) "Master's in Nanoscience".

The Research Master's in Nanoscience has been offered since 2007. More than eighty students have obtained their Master's degree. Almost 50% of our graduates are international students from four continents (Europe, America, Africa and Asia).

Researchers at DIPC participate in this program in various ways and from different perspectives by developing curriculums, giving lectures, acting as counselors to some of the students, and providing seminars on issues of special interest to the students.

In addition, DIPC plays a valuable role, providing essential infrastructure and funding, within its means, to help ensure the proper development of the program.