

The Sixth International Conference
"Dynamics of Systems on the Nanoscale"



DySoN 2020

Regina Elena Hotel
Santa Margherita Ligure, Italy
November 23-27, 2020



THIRD ANNOUNCEMENT

Scope

The Sixth International Conference “Dynamics of Systems on the Nanoscale” (DySoN 2020) will take place on **November 23-27, 2020** in Santa Margherita Ligure, Italy. The Conference is co-organized by the [University of Ferrara](#) (Ferrara, Italy), [University of Kent](#) (Canterbury, United Kingdom) and [MBN Research Center](#) (Frankfurt am Main, Germany).

The DySoN conference has been built upon a series of International Symposia “Atomic Cluster Collisions: structure and dynamics from the nuclear to the biological scale” (ISACC 2003-2019, see [isacc-portal.org](#)). During these meetings it has become clear that there is a need for an interdisciplinary conference covering a broader range of topics than just atomic cluster collisions, related to the Dynamics of Systems on the Nanoscale. Therefore, a new conference series was launched in 2010 under the title “Dynamics of Systems on the Nanoscale”. The first DySoN conference took place in Rome, Italy in 2010. Since then, four further DySoN conferences were held in St. Petersburg, Russia (2012); Edinburgh, United Kingdom (2014); Bad Ems, Germany (2016); and Potsdam, Germany (2018). DySoN 2020 is the sixth conference in this series.

The DySoN 2020 Conference will promote the growth and exchange of interdisciplinary scientific information on the structure formation and dynamics of animate and inanimate matter on the nanometer scale. There are many examples of complex many-body systems of micro- and nanometer scale size exhibiting unique features, properties and functions. These systems may have very different nature and origin, e.g. atomic and molecular clusters, nanostructures, ensembles of nanoparticles, nanomaterials, biomolecules, biomolecular and mesoscopic systems. A detailed understanding of the structure and dynamics of these systems on the nanoscale is a difficult and fundamental task, the solution of which is necessary in numerous applications of nano- and biotechnology, materials science and medicine.

Although mesoscopic, nano- and biomolecular systems differ in their nature and origin, a number of fundamental problems are common to all of them: What are the underlying principles of self-organization and self-assembly of matter at the micro- and nanoscale? Are these principles classical or quantum? How does function emerge at the nano- and mesoscale in systems with different origins? What criteria govern the stability of these systems? How do their properties change as a function of size and composition? How are their properties altered by their environment? Seeking answers to these questions is at the core of a new interdisciplinary field that lies at the intersection of physics, chemistry and biology, a field now entitled Meso-Bio-Nano (MBN) Science.

Experimental, theoretical and applied aspects of these problems will be discussed at DySoN 2020. Particular attention will be devoted to dynamical phenomena and many-body effects taking place in various MBN systems on the nanoscale, which include problems of structure formation, fusion and fission, collision and fragmentation, surfaces and interfaces, collective electron excitations, reactivity, nanoscale phase and morphological transitions, irradiation driven transformations of complex molecular systems, irradiation-induced biodamage, channeling phenomena, construction of novel light sources, and many more. Links of the DySoN topics to novel and emerging technologies will be an important focus of DySoN 2020.

Finally, the conference will provide a platform to host discussions about current research, technological challenges and related initiatives within the Topical Areas of DySoN Conference Series.

Topical Areas of DySoN:

- Structure and dynamics of molecules, clusters and nanoparticles
- Cluster and biomolecular ensembles, composite systems
- Clustering, self-organization, phase and morphological molecular transitions on the nanoscale
- Nanostructured materials, surfaces and interfaces
- Reactivity and nanocatalysis
- Electron and spin transport in molecular systems
- Collision and radiation processes, fusion, fission, fragmentation
- Radiation-induced chemistry
- Irradiation-driven transformations, damage and fabrication of MesoBioNano systems
- Propagation of particles through media
- Biomedical and technological applications of radiation
- Related technologies: novel light sources, controlled nanofabrication, functionalized materials, etc

Important Dates

Distribution of the first announcement	November 01, 2019
Distribution of the second announcement	April 30, 2020
Distribution of the third announcement	July 20, 2020
Deadline for early-bird registration	September 01, 2020
Deadline for hotel reservation	September 15, 2020
Deadline for abstract submission	October 01, 2020

DySoN 2020 Program

Monday, November 23

12 ⁰⁰ – 16 ⁰⁰	Participants registration
14 ⁰⁰ – 14 ¹⁵	DySoN 2020 Opening Vincenzo Guidi, Nigel J. Mason and Andrey V. Solov'yov
14 ¹⁵ – 15 ⁴⁵	<u>Afternoon session I: Dynamics of systems on the nanoscale, Chair: Nigel Mason</u> Andrey Solov'yov , MBN Research Center, Frankfurt am Main, Germany <i>Advances and challenges in computational multiscale modelling of MesoBioNano systems</i> Rodolphe Antoine , Université de Lyon1, France <i>Gold catenane nanoclusters: from silver doping to self-assembled nanostructures</i> Vincenzo Guidi , University of Ferrara, Italy <i>Two dimensional materials and their application to gas sensing</i>
15 ⁴⁵ – 16 ¹⁵	Coffee break
16 ¹⁵ – 18 ¹⁵	<u>Afternoon session II: Structure and dynamics of molecules, clusters and nanoparticles, Chair: Andrey Solov'yov</u> Franco Gianturco , The University of Innsbruck, Austria <i>Quantum behaviour of cold anions in ion traps: selective photodetachment of interstellar molecules</i> Julius Jellinek , Argonne National Laboratory, Argonne, Illinois, USA <i>Universality in size-driven evolution towards bulk polarizability of metals</i> Riccardo Ferrando , University of Genoa, Italy <i>Kinetics vs equilibrium in the growth of nanoalloys</i> Wolfgang Ernst , Graz University of Technology, Graz, Austria <i>Nanomaterials synthesized in helium droplets</i>
19 ⁰⁰ – 22 ⁰⁰	Welcome reception

Tuesday, November 24

9 ³⁰ – 11 ⁰⁰	<u>Morning session I: Reactivity and nanocatalysis, Chair: Julius Jellinek</u> Shiv Khanna , Virginia Commonwealth University, Richmond, USA <i>Bridged superatomic molecules: Unusual nano p- n- junction with tunable band gaps, adjustable band alignment, and effective electron hole separation</i> Andrew Wheatley , University of Cambridge, United Kingdom <i>Engineering surface properties for new energy sector materials</i> Stefan Bromley , University of Barcelona, Spain <i>Understanding size-dependent structure and dynamics of nanoscale oxides: from water splitting to cosmic dust</i>
11 ⁰⁰ – 11 ³⁰	Coffee break
11 ³⁰ – 13 ⁰⁰	<u>Morning session II: Irradiation-driven processes and technologies involving Meso-Bio-Nano systems, Chair: Iliia Solov'yov</u> Beata Ziaja-Motyka , Center for Free-Electron Laser Science, DESY, Hamburg, Germany <i>Transitions in matter induced by intense X-ray radiation and their diagnostics</i> Michael Huth , Goethe University, Frankfurt am Main, Germany <i>Simulation-guided 3D direct-write nanofabrication with focused electron beams</i>

	<p>Maurizio Dapor, University of Trento, Italy <i>Simulation of low energy electron transport in condensed matter for technological and medical applications</i></p> <p>Pablo de Vera, University of Murcia, Spain <i>Detailed simulations of focused electron beam induced deposition by interfacing Monte Carlo and Molecular Dynamics techniques</i></p>
13 ⁰⁰ – 14 ³⁰	Lunch
14 ³⁰ – 16 ⁰⁰	<p><u>Afternoon session I: Collision and radiation processes, fusion, fission, fragmentation,</u> Chair: Franco Gianturco</p> <p>Ilko Bald, University of Potsdam, Germany <i>Plasmon chemistry revealed by surface-enhanced Raman scattering</i></p> <p>Juraj Fedor, J. Heyrovský Institute of Physical Chemistry, Czech Republic <i>Statistical vs. non-statistical emission of electrons from hot anions</i></p> <p>Ilya Fabrikant, University of Nebraska-Lincoln, Nebraska, USA <i>Positronium collisions with molecules</i></p> <p>Malgorzata Smialek-Telega, Gdansk University of Technology, Poland <i>What happens if phenol meets toluene?</i></p>
16 ⁰⁰ – 16 ³⁰	Coffee break
16 ³⁰ – 18 ⁰⁰	<u>Poster session</u>

Wednesday, November 25

9 ³⁰ – 11 ⁰⁰	<p><u>Morning session I: Propagation of particles through media,</u> Chair: Vincenzo Guidi</p> <p>Andrei Korol, MBN Research Center, Frankfurt am Main, Germany <i>Crystal based gamma-ray light sources</i></p> <p>Werner Lauth, Institute of Nuclear Physics, University of Mainz, Germany <i>Characterization of crystalline undulators at the Mainz Microtron MAMI</i></p> <p>Laura Bandiera, Istituto Nazionale di Fisica Nucleare, Ferrara, Italy <i>Recent experimental results on high energy electromagnetic processes in strong crystalline fields</i></p>
11 ⁰⁰ – 11 ³⁰	Coffee break
11 ³⁰ – 13 ⁰⁰	<p><u>Morning session II: Coherence and radiation processes in irradiated targets,</u> Chair: Andrei Korol</p> <p>Silvia Ramos, University of Kent, Canterbury, United Kingdom <i>Nanostructure probed by X-ray absorption spectroscopy</i></p> <p>Nektarios Papadogiannis, Hellenic Mediterranean University, Heraklion, Greece <i>Laser-plasma secondary X-ray sources with high coherence: An important tool for spatiotemporal nanoscopy of structural changes in matter</i></p> <p>Vadim Ivanov, Peter the Great St. Petersburg Polytechnical University, Russia <i>Channeling and radiation of electrons and positrons in straight and periodically bent diamond crystals</i></p> <p>Victor Tikhomirov, Belarusian State University, Minsk, Belarus <i>Relativistic particle scattering by crystal planes</i></p>
13 ⁰⁰ – 13 ¹⁵	Conference photo
13 ¹⁵ – 14 ³⁰	Lunch
14 ³⁰ – 16 ⁰⁰	<p><u>Afternoon session I: Design and practical realization of novel gamma-ray crystal-based light sources,</u> Chair: Werner Lauth</p> <p>Hartmut Backe, Institute of Nuclear Physics, University of Mainz, Germany <i>Reflections on channeling of electrons in single crystals, based on experiments, simulations and the Fokker-Planck equation</i></p>

	<p>Davide De Salvador, University of Padova, Italy <i>Pulsed laser processes for nanoscale doping and strain control</i></p> <p>Thu Nhi Tran Caliste, European Synchrotron Radiation Facility, Grenoble, France <i>Defect / distortion characterisation of crystals and deposited layers: new capabilities using quantitative X-ray Bragg diffraction imaging</i></p> <p>Andrea Mazzolari, Istituto Nazionale di Fisica Nucleare, Ferrara, Italy <i>Manufacturing of crystals for coherent interactions with high-energy particle beams</i></p>
16 ⁰⁰ – 18 ⁰⁰	Conference Tour

Thursday, November 26

9 ³⁰ – 11 ⁰⁰	<p><u>Morning session I: Interaction of radiation with biosystems: mechanisms and applications</u>, Chair: Thomas Schlathölter</p> <p>Ilia Solov'yov, Carl von Ossietzky University, Oldenburg, Germany <i>Structure and dynamics of cryptochrome photoreceptors</i></p> <p>Eugene Surdutovich, Oakland University, USA <i>Multiscale approach to ion-beam therapy as an idea and as an accomplishment</i></p> <p>Martin Falk, Institute of Biophysics of the CAS, Brno, Czech Republic <i>DNA damage and repair in normal and tumour cells - the micro-scale and nano-scale views</i></p>
11 ⁰⁰ – 11 ³⁰	Coffee break
11 ³⁰ – 13 ⁰⁰	<p><u>Morning session II: Interaction of radiation with bio-nano systems: mechanisms and applications</u>, Chair: Martin Falk</p> <p>Nigel Mason, University of Kent, Canterbury, United Kingdom <i>Are nanoparticles a panacea for radiotherapy or a chimera?</i></p> <p>Gérard Baldacchino, Université Paris-Saclay, Gif-sur-Yvette, France <i>Exposition to extreme ionizing radiations and consequences on the nanoparticles effects for therapy</i></p> <p>Alexey Verkhovtsev, MBN Research Center, Frankfurt am Main, Germany <i>Computational modeling of radiosensitising nanoparticles with MBN Explorer</i></p> <p>Alexandra Guerreiro, The Open University, Milton Keynes, United Kingdom <i>Comparison of the radiosensitising ability of Period 4 transition metal oxide nanoparticles</i></p>
13 ⁰⁰ – 14 ³⁰	Lunch
14 ³⁰ – 16 ⁰⁰	<p><u>Afternoon session I: Interaction of radiation with biomolecular systems: mechanisms and applications</u>, Chair: Eugene Surdutovich</p> <p>Thomas Schlathölter, Zernike Institute for Advanced Materials, University of Groningen, The Netherlands <i>Structural dynamics in DNA nanostructures observed in a free-electron-laser pump-probe experiment</i></p> <p>Sadia Bari, Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany <i>Site-selective photoexcitation and dissociation of biomolecules</i></p> <p>Hidetsugu Tsuchida, Kyoto University, Japan <i>Dissociation of biomolecules in liquid water by various excitation methods</i></p> <p>Ida Friis, University of Southern Denmark, Odense, Denmark <i>The impact of ion-induced shock waves in biological medium</i></p>
16 ⁰⁰ – 16 ³⁰	Coffee break
16 ³⁰ – 18 ⁰⁰	<p><u>Afternoon session II: Radiation-induced chemistry</u>, Chair: Ilko Bald</p> <p>Kit Bowen, Johns Hopkins University, Baltimore, USA <i>Adventures in negative ion photoelectron spectroscopy</i></p> <p>Hassan Abdoul-Carime, University of Lyon, France <i>Selective chemistry triggered by slow electrons</i></p> <p>Béla Sulik, Institute for Nuclear Research (Atomki), Debrecen, Hungary</p>

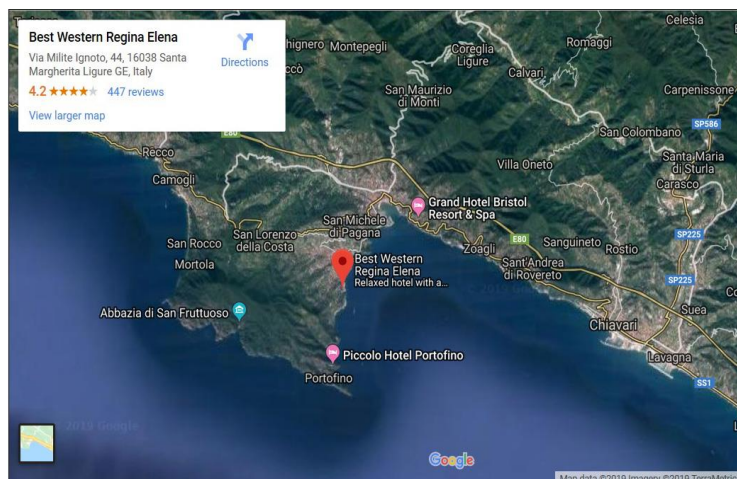
	<i>Ion impact ionization in gases and ices</i> Filipe Ferreira da Silva , Universidade Nova de Lisboa, Caparica, Portugal <i>Electron interactions with HFC (R134a) refrigerant gas</i>
19 ⁰⁰ – 22 ³⁰	Conference Dinner

Friday, November 27

9 ³⁰ – 11 ⁰⁰	Morning session I: Dynamics of systems on the nanoscale, Chair: Alexey Verkhovtsev Sascha Schäfer , Carl von Ossietzky University, Oldenburg, Germany <i>Spatio-temporal mapping of ultrafast nanoscale dynamics by femtosecond electron pulses</i> Ken Knappenberger , Dept. of Chemistry, Penn State University, USA <i>Electronic relaxation dynamics in quantum metals</i> Konstantin Katin , National Research Nuclear University MEPhI, Moscow, Russia <i>Novel nickel-based 2D materials for hydrogen storage</i>
11 ⁰⁰ – 11 ¹⁵	Final Discussion and DySoN 2020 Closing

Conference Venue and Travel Information

The Conference will be hosted by [Best Western Hotel Regina Elena](#), Lungomare Milite Ignoto 44, 40128 Santa Margherita Ligure, Italy. The hotel is located on the seafront that connects **Santa Margherita Ligure to Portofino**, among the **Regional Natural Park** and the Tigullio Gulf and **the Marine Protected Area** of Portofino.



Santa Margherita Ligure is a municipality in the Italian region Liguria, located about 35 kilometers southeast of Genoa, in the area traditionally known as Tigullio. The town is known for Castello di Santa Margherita Ligure, built by the Republic of Genoa in 1550 as a defense against the increasing attacks of North African pirates, as well as for Villa Durazzo - a complex that includes two patrician villas, a 16th-century castle and a 17th-century park.

The information on how to reach the conference venue can be found [here](#). The hotel is located about 35 km away from the Genoa Airport, 150 km from the Pisa Airport and about 220 km from Milan-Malpensa and Milan-Bergamo airports. Santa Margherita Ligure train station is operated by Trenitalia, see [here](#) for prices and schedule. The venue can also be reached by car from A12 highway (exit Rapallo).

Detailed information on how to reach the conference venue will be circulated closer to the conference dates.

Financial support

A limited number of bursaries (300 Euros each) will be provided by the Sir John and Lady Mason Academic Trust for Early Career Researchers defined as Masters students doing research projects, PhD students and early postdocs (up to 3 years after PhD). Recipients of bursaries must have an abstract accepted either as oral or poster presentation. Applications should be sent to dyson.conference@gmail.com with copy of submitted abstract(s) before October 01, 2020.

Reduced registration fee (350 € (early-bird) / 400 € (late)) will be offered to the members of [the Virtual Institute of Nano Films \(VINNF\)](#).

Best poster prize for Early Career Researchers

Thanks to one of our sponsors, Springer Verlag, we are organizing a competition for the best poster prize for Early Career Researchers. The prize will consist on both a certificate and an economic reward.

Topical Issue of the European Physical Journal D

A Topical Issue “Dynamics of Systems on the Nanoscale (2020)” will be launched in the [European Physical Journal D: Atomic, Molecular, Optical and Plasma Physics](#). The main scope of this topical issue will be to present recent advances and perspectives in this highly interdisciplinary field of modern research. It will include regular articles, as well as review and colloquium papers.

Submission to this Topical Issue will be opened to the entire research community working in the DySoN topical areas and is not restricted to the participants of the DySoN 2020 Conference. All conference participants are encouraged to submit their novel results to this Topical Issue.

The deadline for submission is March 31, 2021.

Further information will be available on the conference website soon.

Registration

The number of rooms reserved at the hotel for conference participants is limited. We advise the participants to register for the conference and the hotel at the earliest convenience.

- Regular conference fee: **450 €** (early-bird) / **500 €** (late)
- Undergraduate and PhD students: **350 €** (early-bird) / **400 €** (late)
- Accompanying persons: **120 €** (+optional 3-lunch pack for 105 €)

The conference fee will cover the book of abstracts, coffee breaks, lunches, the conference reception, a sightseeing tour and the conference dinner. The fee for accompanying persons includes the conference reception, a sightseeing tour and the conference dinner. Optionally, accompanying persons can also book a 3-lunch package for 105 € (35€ per lunch).

The payment to the order of “DySoN 2020” can be made **by bank transfer** to

Bank Account Name: MBN Research Center gGmbH
Bank name: Deutsche Bank
Branch Address: Hauptstr. 561462 Koenigstein Germany
IBAN: DE15500700240137588000
BIC: DEUTDEDBFRA

Please quote your **NAME** and **DYSON** on the transfer. Please ensure there are **NO** charges to us.

If you need an invoice for the payment or want to pay with a credit card, please send a short email to dyson.conference@gmail.com.

Accommodation

Please book accommodation directly with the [Best Western Hotel Regina Elena](#) and quote “DYSON” to book either (i) a single room for 55€ per night, or (ii) a double room for single use for 69€ per night, or (iii) a double/twin room for 40€ per night per person. There is also a supplement of 30€ per room per night for a double/twin room with balcony and sea view. The rooms will be reserved before September 15, 2020, and will then be released so please book early.

Official Invitation and Visa

Conference participants are advised to check the passport and visa requirements for travel to Italy well in advance. For invitation requests please contact Professor Vincenzo Guidi (University of Ferrara), see the contact information below.

International Advisory Committee

- Andrey V. Solov'yov (MBN Research Center, Frankfurt am Main, Germany) - **IAC Chair**
- Ilko Bald (University of Potsdam, Germany)
- Catherine Bréchnignac (Laboratoire Aime Cotton, CNRS, Orsay, France)
- Michel Broyer (University of Lyon, France)
- Jean-Patrick Connerade (Imperial College London, London, UK)
- Franco Gianturco (The University of Innsbruck, Austria)
- Vincenzo Guidi (University of Ferrara, Italy)
- Julius Jellinek (Argonne National Laboratory, Argonne, Illinois, USA)
- Shiv Khanna (Virginia Commonwealth University, Richmond, USA)

- Nigel Mason (University of Kent, Canterbury, UK)
- Iliia Solov'yov (Carl von Ossietzky University, Oldenburg, Germany)
- Eugene Surdutovich (Oakland University, Rochester, Michigan, USA)

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- Vincenzo Guidi (University of Ferrara, Italy) - **Co-Chair**
- Nigel Mason (University of Kent, United Kingdom) - **Co-Chair**
- Andrey Solov'yov (MBN Research Center, Germany) - **Co-Chair**
- Laura Bandiera (INFN, Ferrara, Italy)
- Andrei Korol (MBN Research Center, Germany)
- Andrea Mazzolari (INFN, Ferrara, Italy)
- Iliia Solov'yov (Carl von Ossietzky University, Oldenburg, Germany)
- Irina Solovyeva (MBN Research Center, Germany)
- Alexey Verkhovtsev (MBN Research Center, Germany)

Sponsors

The conference will be held under the auspices of the following sponsors:

- MBN Research Center, Frankfurt am Main, Germany
- University of Ferrara, Ferrara, Italy
- University of Kent, Canterbury, United Kingdom
- Sir John and Lady Mason Academic Trust
- Virtual Institute of Thin Films
- Springer Verlag
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DySoN Conference Web Page

Updated information on the conference series is available at www.dyson-conference.org

Conference e-mail

dyson.conference@gmail.com