International Conference
"Dynamics of Systems on the Nanoscale"

DYSON

DySoN 2023

Vila Lanna
Prague, Czech Republic
April 24-26, 2023

FINAL ANNOUNCEMENT

Scope

The Seventh International Conference "Dynamics of Systems on the Nanoscale" (DySoN 2023) will take place on **April 24-26, 2023, in Vila Lanna, Prague, Czech Republic**. The conference is co-organized by the University of Kent (Canterbury, United Kingdom) and MBN Research Center (Frankfurt am Main, Germany).

The DySoN Conference will be followed by the MultIChem 2023 Conference – the 2nd Annual Conference of the COST Action CA20129 "Multiscale Irradiation and Chemistry Driven Processes and Related Technologies" (MultIChem), which will be held on April 26-28 at the same venue.

DySoN is an interdisciplinary conference series covering a broad range of topics related to the Dynamics of Systems on the Nanoscale. The DySoN conference series was launched in 2010, and six DySoN conferences have been held so far. The DySoN conferences 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 origins, 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 for nano- and biotechnologies, 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 of 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 of Meso-Bio-Nano (MBN) Science that lies at the intersection of physics, chemistry and biology.

Experimental, theoretical, computational and applied aspects of the aforementioned problems will be discussed at the DySoN 2023 Conference. Particular attention will be devoted to dynamical phenomena and many-body effects taking place in various MBN systems on the nanoscale. They 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 and biodamage, channeling phenomena, and many more. Links of the DySoN topics to novel and emerging technologies will be an important focus of the conference.

Finally, DySoN 2023 will provide a platform to host discussions about current research, technological challenges and related initiatives within the Topical Areas of the 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 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

DySoN 2023 Scientitic Program

Monday, April 24

$08^{00} – 09^{00}$	Participants registration
$09^{00} – 09^{10}$	**DySoN 2023 Opening**
$09^{10} – 11^{00}$	**<u>Morning session I: Dynamics of systems on the nanoscale</u> (Chair: Nigel J. Mason)** **Andrey Solov'yov**, MBN Research Center, Frankfurt am Main, Germany *Reactive and irradiation driven molecular dynamics research breakthroughs with MBN Explorer* **Ilko Bald**, Institute of Chemistry, University of Potsdam, Germany *Hybrid nanostructures for sensitive surface-enhanced Raman scattering (SERS) and plasmonic chemistry* **Eric Suraud**, Laboratoire de Physique Théorique, Université de Toulouse, France *(Un)expected behaviors of small molecules after (ultra)fast XUV irradiation* **Hidetsugu Tsuchida**, Quantum Science and Engineering Center, Kyoto University, Japan *Radiolysis of liquid water occurring around ion tracks of carbon beams*
$11^{00} – 11^{20}$	Coffee break
$11^{20} – 13^{10}$	**<u>Morning session II: Structure and dynamics of biomolecular and biological systems</u> (Chair: Ilia A. Solov'yov)** **Michael Hausmann**, Kirchhoff-Institute for Physics, Heidelberg University, Germany *Functionally determined spatial organisation of receptors and proteins integrated in bi-lipid membranes of cells* **Martin Falk**, Institute of Biophysics, Czech Academy of Sciences, Brno, Czech Republic *Update on the relationship between the architecture of repair foci (IRIF) and DSB repair* **Marc Benjamin Hahn**, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany *The change of DNA and protein radiation damage upon hydration: In-situ observations by near-ambient-pressure XPS* **Dorothea Hallier**, Fraunhofer Institute for Cell Therapy and Immunology, Potsdam, Germany *X-ray damage to Gene-V Protein: UHV and NAP-XPS analysis of Chemical changes to Proteins*
$13^{10} – 14^{30}$	Lunch
$14^{30} – 16^{10}$	**<u>Afternoon session I: Structure and dynamics of molecules, clusters and nanoparticles</u> (Chair: Ilko Bald)** **Luca Gerhards**, Carl von Ossietzky University Oldenburg, Germany *Spin dynamics and spin relaxation in biological systems – Introducing MolSpin as versatile toolkit* **Robin Schürmann**, Physikalisch-Technische Bundesanstalt, Berlin, Germany *Elucidating chemical reactions on nanoparticles by synchrotron X-ray-techniques* **Anushree Dutta**, Institute of Chemistry, University of Potsdam, Germany *Kinetics and mechanism of plasmon driven dehalogenation reaction of brominated nucleobases* **Vasyl Shvalya**, Jožef Stefan Institute, Ljubljana, Slovenia *Bacterial DNA distinctive SERSing with plasma-printed nanogold*
$16^{10} – 16^{30}$	Coffee break
$16^{30} – 18^{30}$	**<u>Afternoon session II: Clustering, self-organization, phase and morphological transitions on the nanoscale</u> (Chair: Beata Ziaja-Motyka)** **Wolfgang Ernst**, Graz University of Technology, Austria *Mixed-metal nanoparticles – core-shell structures, phase transitions and alloying*

	Felipe Fantuzzi, University of Kent, Canterbury, United Kingdom *Unraveling structural changes in graphene and lithium fluoride nanostructures: Insights from reactive and Born-Oppenheimer molecular dynamics simulations* **Miloš Baljozović**, Swansea University, United Kingdom *Imaging neuromorphic dynamics of percolating nanocluster networks* **Theodoros Pavloudis**, Swansea University, United Kingdom *Multiscale modeling of Au-C nanostructured systems: Nanoparticle shapes and neuromorphic dynamics*
$19^{30} – 22^{00}$	Welcome reception

Tuesday, April 25

$09^{00} – 10^{50}$	**<u>Morning session I: Nanostructured materials, surfaces and interfaces</u>** **(Chair: Wolfgang Ernst)** **Andrew Wheatley**, University of Cambridge, United Kingdom *Dual control of morphology and composition in heterobimetallic catalysts for oxygen reduction* **David Field**, Aarhus University, Denmark *The challenge of the spontelectric state* **Vincenzo Guidi**, University of Ferrara, Italy *Reversible chemisorption of gases on nanostructures for gas sensing* **Agata Kowalska**, Maritime University in Szczecin, Poland *XRD and PAS investigation of crystal lattice defects induced in Zr by low energy deuterons*
$10^{50} – 11^{20}$	Coffee break
$11^{20} – 13^{10}$	**<u>Morning session II: Nanostructured materials, surfaces and interfaces</u>** **(Chair: David Field)** **Beata Ziaja-Motyka**, Center for Free-Electron-Laser Science CFEL, Deutsches Elektronen Synchrotron DESY, Hamburg, Germany *Femtosecond dissociation of disulfide bridges within X-ray irradiated thaumatin crystal* **Liv Hornekær**, Interdisciplinary Nanoscience Center, Aarhus University, Denmark *Imaging interstellar dust grain model surfaces and reaction products with atomic resolution* **Péter Herczku**, Atomki Institute for Nuclear Research, Debrecen, Hungary *Charged particle impact experiments on astrophysical ice analogues* **Sergei Piskunov**, Institute of Solid State Physics, University of Latvia, Riga, Latvia *Nonadiabatic molecular dynamics simulations of chlorine behavior at nanostructured TiO_2(110)/water interface*
$13^{10} – 14^{30}$	Lunch
$14^{30} – 16^{00}$	**<u>Afternoon session I: Reactivity and nanocatalysis</u> (Chair: Andrew Wheatley)** **Dmitry Momotenko**, Carl von Ossietzky University Oldenburg, Germany *Electrochemical nanotechnology: 3D printing of metals at the nanoscale* **Rodolphe Antoine**, Université Claude Bernard Lyon1, France *Playing with the photophysics of atomically precise nanoclusters: From photo-thermal to photodynamic effects* **Shiv Khanna**, Virginia Commonwealth University, USA *Using superatomic metal-chalcogenide clusters and charge transfer ligands for nano p- n- junctions with tunable band gaps and band alignment, light harvesting and CO_2 conversion*
$16^{00} – 16^{30}$	Coffee break

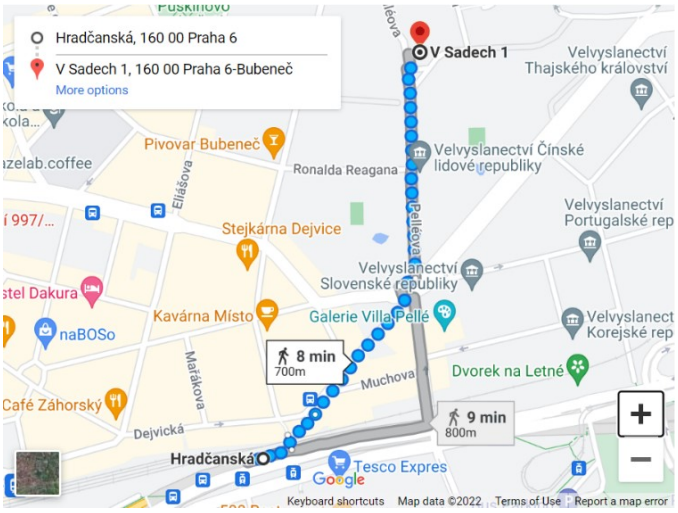
$16^{30} – 18^{30}$	**<u>Afternoon session II: Special session on the occasion of 80th birthday of Professor Jean-Patrick Connerade</u>** **<u>Chairs</u>: Nigel Mason** (University of Kent, Canterbury, UK) and **Andrey Solov'yov** (MBN Research Center, Frankfurt am Main, Germany) *Introduction* **Mike Mansfield**, Physics Department, University College Cork, Ireland *Atomic Giant Resonances: experiments in Frascati and Bonn* **Aslam Baig**, National Centre for Physics, Quaid-i-Azam University, Islamabad, Pakistan *Work at Imperial College, Bonn University, and Islamabad* **George Philip**, India *The Laser Laboratory at the University of Kuwait* **John Marangos**, Physics Department, Imperial College London, United Kingdom *Dynamics of molecular photoionisation* **Jean-Claude Lehmann**, Kastler-Brossel Laboratory, Ecole Normale Supérieure, Paris, France & **Michel Broyer**, Université Claude Bernard, Lyon, France *An "English" physicist in France. Molecules, superatoms, Sychrotron radiation, … friendship and poetry* **Chris Mayhew**, Institut für Atemgasanalytik, Universität Innsbruck, Austria *J P Connerade: "the Atomic Physicist or there and back again" (with due credit to JRR Tolkien)* **Stephen Hogan**, Department of Physics and Astronomy University College London, UK *Rydberg atoms in crossed electric and magnetic fields: From quantum chaos to geometric phase*

Wednesday, April 26

$09^{00} – 10^{30}$	**<u>Morning session I: Propagation of particles through media</u> (Chair: Vincenzo Guidi)** <u>**Andrei Korol**</u> & **Andrey Solov'yov**, MBN Research Center, Frankfurt am Main, Germany *Horizon Europe EIC-Pathfinder Project TECHNO-CLS: "Emerging technologies for crystal-based gamma-ray light sources"* **Werner Lauth**, Institute of Nuclear Physics, University of Mainz, Germany *Development of a positron beamline for channeling experiments at MAMI* **Laura Bandiera**, Istituto Nazionale di Fisica Nucleare, Ferrara, Italy *Channeling radiation experiments with multi-GeV electron and positron beams: Recent results and future perspectives*
$10^{30} – 10^{50}$	Coffee break
$10^{50} – 12^{30}$	**<u>Morning session II: Design and practical realization of novel gamma-ray crystal-based light sources</u> (Chair: Werner Lauth)** **Davide De Salvador**, University of Padova, Italy *Pulsed laser melting for crystals bending* **Konstantinos Kaleris**, Institute for Plasma Physics and Lasers, Hellenic Mediterranean University, Heraklion, Greece *Progress on dynamic structural lattice modulation of single crystals for CLS applications* **Riccardo Negrello**, University of Ferrara, Italy *Investigation of radiation emitted by sub-GeV electrons in oriented scintillator crystals* **Thu Nhi Tran Caliste**, European Synchrotron Radiation Facility, Grenoble, France *Coupling X-ray beam induced current and X-ray diffraction imaging to characterize diamond plates used as semiconductor-based detectors*
$12^{30} – 12^{40}$	**DySoN 2023 Closing**

Conference Venue and Travel Information

DySoN 2023 will be held in Vila Lanna (V Sadech 1, 160 00 Prague 6), the conference center of the Czech Academy of Sciences located in Prague. The conference venue is located within the walking distance from the metro station Hradčanská (Prague metro line A).



The conference venue is well connected with Prague public transport. For more information, please visit the Prague public transport website: https://www.dpp.cz/en.

Detailed information on how to reach the conference venue will be circulated with the final announcement.

Registration

Late registration for the DySoN 2023 conference is still possible. The registration fee is **400 €** for regular participants and **350 €** for undergraduate and PhD students. The fee includes access to the conference hall, poster session, coffee breaks, lunches, and the book of abstracts.

The payment to the order of "DySoN 2023" can be made **by bank transfer** to

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

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- Irina Solovyeva (MBN Research Center, Germany)
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Sponsors

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

- MBN Research Center, Frankfurt am Main, Germany
- University of Kent, Canterbury, United Kingdom
- H2020-MSCA-RISE Project "N-Light"
- H2020-MSCA-RISE Project "RADON"
- HORIZON EUROPE EIC-PATHFINDER Project "TECHNO-CLS"

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DySoN Conference Web Page

Updated information on the DySoN 2023 conference is available at www.dyson-conference.org.

DySoN 2023 Conference e-mail

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