

Conference Program Diffusion Fundamentals V

Monday, August 26th, 2013

9:15 Welcome
 Matthias Schwarz (Vice-Rector for Research and Young Academics)
 Organizing Committee

Biophysics and Single Molecules

Chair: Gunter Schütz (Forschungszentrum Jülich, Germany)

9:30 Steve Granick (University of Illinois at Urbana-Champaign, USA)
 Surprises from Single-Particle Imaging of Passive and Active Diffusion

10:05 Akihiro Kusumi (Kyoto University, Japan)
 *Hypothesis of Unit Rafts as Organizers of the Meso-scale Domain Structure
 and Function in the Plasma Membrane*

10:40 Coffee Break

11:10 Thomas Schmidt (Leiden University, The Netherlands)
 How Diffusion might lead to Non-linear Response

11:45 Eli Barkai (Bar-Ilan University, Israel)
 Weak Ergodicity Breaking for Single Molecule Diffusion in the Cell

12:20 Lunch

Biophysics and Single Molecules

Chair: Marc-Olivier Coppins (University College London, UK)

14:00 Ilpo Vattulainen (Tampere University of Technology, Finland)
 *Diffusion Driving the Formation of Functional Nanoscale Machines
 in Cell Membranes*

Porous and Confined Systems

Chair: Marc-Olivier Coppins (University College London, UK)

14:35 Peter Reimann (Universität Bielefeld, Germany)
 Modeling DNA-Translocation through Nanopores: Two Case Studies

15:10 Matthias Fuchs (Universität Konstanz, Germany)
 Driven Motion of Colloids in Active Microrheology

15:45 Gerhard Schmid (Universität Augsburg, Germany)
 Diffusive Transport in Corrugated Channels

16:20 Coffee & Posters AI, B, C, D (Foyer)

18:45 Dinner (On Site)

Plenary Lecture

Chair: Jörg Kärger (Universität Leipzig, Germany)

20:15 Cees Dekker (Delft University of Technology, The Netherlands)
 The Appeal of Single-Molecule and Single-Cell Studies

Tuesday, August 27th, 2013

Fluctuations, Optical Traps, Hot Colloids

Chair: Armin Bunde (Universität Gießen, Germany)

- 9:00 Ernst-Ludwig Florin (University of Texas at Austin, USA)
Seeing is Believing: Direct Visualization of Fluctuations in Biopolymer Networks with 3D Thermal Noise Imaging
- 9:35 Erik Schäffer (Universität Tübingen, Germany)
Hydrodynamic Resonance in Optical Traps & Friction of Molecular Machines
- 10:10 Debashish Chowdhury (Indian Institute of Technology, India)
First Passage Times: A Common Theme in the Kinetics of Macromolecular Motors
- 10:45 Coffee Break
- 11:15 Werner Köhler (Universität Bayreuth, Germany)
Hot Colloids in Polymer Networks: Cage Formation and Transient Network Deformation
- 11:50 Lunch & Posters AII, E, F (Foyer)

Excursion

- 14:30 Departure to the Monument to the Battle of the Nations
- 16:30 Concert at Alte Handelsbörse
- 18:00 Guided City Tour
- 19:00 Conference Dinner (Ratskeller Leipzig)

Wednesday, August 28th, 2013

Dynamics in Social and Animal Systems

Chair: Gero Vogl (Universität Wien, Austria)

9:00 Ingolf Kühn (Helmholtz Center for Environmental Research, Halle, Germany)
Drivers and Impacts of the Spread of Alien Species in Europe

9:35 Matthew Turner (University of Warwick, UK)
Dynamics in Social Fluids

10:10 Coffee Break

Active Brownian Motion

Chair: Michael Saxton (University of California, USA)

10:40 Clemens Bechinger (Universität Stuttgart, Germany)
Active Brownian Motion of Asymmetric Particles

11:15 Masaki Sano (The University of Tokyo, Japan)
Self-Organization Dynamics of Active Colloids

11:50 Best Poster Talks

12:30 Lunch

Active Brownian Motion

Chair: William S. Price (University of Western Sydney, Australia)

14:00 Paul Chaikin (New York University, USA)
Diffusion and Organization in Driven Particles Systems

14:35 Coffee Break

Diffusion in Material Science

Chair: Helmut Mehrer (Universität Münster, Germany)

15:05 Paul Heitjans (Universität Hannover, Germany)
Diffusion in Lithium Ion Conductors – From Fundamentals to Applications

15:40 Nicholaas Stolwijk (Universität Münster, Germany)
Ionic Transport and Pair Formation in Polymer Electrolytes

16:15 Friedrich Kremer (Universität Leipzig, Germany)
Glassy Dynamics of Polymers in Geometrical Confinement: From Nanometric Layers to Single Condensed Isolated Coils

16:35 Closing Remarks
Organizing Committee

17:30 Dinner (Bayerischer Bahnhof)

Poster Presentations Diffusion Fundamentals V

Poster Session I

Monday, August 26th, 2013, 16:20–18:45

Ground Floor, Faculty of Chemistry and Mineralogy

AI – Biophysics and Single Molecules I

- A1 Single molecule study of heterogeneous dynamics in polymers
*Subhasis Adhikari**, *Frank Cichos*
- A2 Characterization of diffusion processes observed with measurement noise by the distribution of diffusivities
*Michael Bauer**, *Günter Radons*
- A3 Characterization of diffusion processes by the distribution of diffusivities
Tony Albers, *Michael Bauer**, *Mario Heidernätsch**, *Günter Radons*
- A4 Optical tracking of single Ag nanodots in nanostructured water films
Stefan Krause, *Martin Hartmann*, *Ingolf Kahle*, *Martin Neumann*, *Stefan Spange*,
*Christian von Borczyskowski**
- A5 Diffusive protofilament switching of kinesin-8 investigated with optical tweezers
*Michael Bugiel**, *Elisa Böhl*, *Erik Schäffer*
- A6 Intracellular trafficking of lipoplexes: a particle image correlation spectroscopy (PICS) study
*Stefano Coppola**, *Daniela Pozzi*, *Giulio Caracciolo*, *Thomas Schmidt*
- A7 High speed single molecule tracking on lipid membranes
*Jens Ehrig**, *Susann Spindler*, *Vahid Sandoghdar*
- A8 Dancing along microtubules: molecular mechanism of one-dimensional diffusive motion of proteins along microtubules
*Sergii Gaidar**, *Stefan Diez*
- A9 Cell stiffening and softening evoked by optical stress application
*Roland Stange**, *Kenechukwu David Nnetu**, *Josef A. Käs*
- A10 Diffusion in a hard-disk fluid with immobile particles: molecular transport in the plasma membrane
*Ziya Kalay**, *Takahiro K Fujiwara*, *Akihiro Kusumi*
- A11 Modeling Ca^{2+} diffusion in brain extracellular space
*Padideh Kamali-Zare**, *Charles Nicholson*

- A12 Two-dimensional semiflexible polymers under external fields
*Antonio Lamura**, *Roland G. Winkler*
- A13 Diffusible crosslinkers generate directed forces in microtubule networks
*Zdenek Lansky**, *Marcus Braun*, *Pieter Rein ten Wolde*, *Marcel E Janson*, *Stefan Diez*
- A14 Brain microscopy point spread function in a photon diffusion limit
*David P. Lewis**, *Fanrong Xiao*, *Sabina Hrabetova*, *Jan Hrabec*
- A15 Ring polymers diffusing in a gel: topology and dynamics
*Davide Michieletto**, *Davide Marenduzzo*, *Gareth P. Alexander*, *Enzo Orlandini*, *Matthew S. Turner*
- A16 Kinesin and dynein respond differently to cytoplasmic drag
*Guilherme Nettesheim**, *Rafael A. Longoria*, *Allyson M. Rice*, *George T. Shubeita*
- A17 Assessment of GABARAP self-association by its diffusion properties
Víctor Hugo Pacheco Torres
- A18 Interaction of semiflexible polymers and rod-like colloidal particles with strongly charged lipid membranes
*Eugene P. Petrov**, *Anastasiia Artemieva*, *Christoph Herold*, *Petra Schwille*
- A19 Cytoskeletal pinning prevents large-scale phase separation in model membranes
*Eugene P. Petrov**, *Senthil Arumugam*, *Jens Ehrig*, *Petra Schwille*

B – Nanopores and Nanoprobes

- B1 Translational diffusion at the surface of porous media with magnetic impurities via Fast Field Cycling NMR relaxometry
*Ioan Ardelean**, *Sergiu Muncaci*, *Codruta Badea*, *Alexandra Pop*, *Carlos Mattea*, *Siegfried Stapf*
- B2 Structural and transport properties of hydrogen in ZIF-22
*Uthumporn Arsawang**, *Siegfried Fritzsche*, *Wolfhard Janke*, *Jürgen Caro*, *Tawun Rem-sungnen*, *Supot Hannongbua*
- B3 NMR studies of benzene mobility in metal-organic framework UiO-67
*Bård A. Bendiksen**, *Eddy W. Hansen*, *Harald Walderhaug*
- B4 Mass-transfer of binary mixtures in DDR single crystals
*Tomas Binder**, *Christian Chmelik*, *Jörg Kärger*, *Douglas M. Ruthven*
- B5 Projection of two-dimensional diffusion in a curved midline and narrow varying width channel on a curved surface
*Guillermo Chacón-Acosta**, *Inti Pineda*, *Leonardo Dagdug*

- B6 Enhancing diffusion selectivities by molecular traffic control in FER-type zeolites
*Christian Chmelik**, Florian Hibbe, Alexander Lauerer, Jörg Kärger, Jasper M. van Baten, Rajamani Krishna, V.R. Reddy Marthala, Jens Weitkamp
- B7 Diffusion and adsorption of N₂ and C₂H₆ in ZIF-8 MD and MC simulations
*Tadija Chokbunpiam**, Rungroi Chanajaree, Oraphan Saengsawang, Siegfried Fritzsche, Christian Chmelik, Wolfhard Janke, Jürgen Caro, Tawun Remsungnen, Supot Hannongbua
- B8 Simplified theory to predict mixture diffusion in zeolites: Accounting for strong correlations and examining the role of adsorption thermodynamics
*Sanjeev M. Rao, Marc-Olivier Coppens**
- B9 Single-file dynamics in nanotubular materials probed by a combination of hyperpolarized tracer exchange and diffusion NMR techniques
*Muslim Dvoyashkin**, Aiping Wang, Hrishi Bhase, Sergey Vasenkov, Clifford R. Bowers
- B10 Diffusion investigation for hydrogen guest molecules in an adapted force field for ZIF-11
*Siegfried Fritzsche**, Philipp Schierz, Wolfhard Janke, Supot Hannongbua, Oraphan Saengsawang, Christian Chmelik
- B11 Surface diffusion of polymers on carbon nanotubes
*István Furó**, Ricardo Fernandes, Michael Shtein, Ilan Pri Bar, Oren Regev, Eduardo F. Marques
- B12 Fermi acceleration induces self-organized critical characteristics to the driven Lorentz channel
*Alexandros K. Karlis**, Fotios K. Diakonou, Christoph Petri, Peter Schmelcher
- B13 Transport into zeolite nanosheets: diffusion equations put to test
*Nils E.R. Zimmermann, Timm J. Zabel, Frerich J. Keil**
- B14 The inter and intra-molecular dynamics of polymethylphenylsiloxane under 1-D and 2-D confinement
*Wycliffe K. Kipnusu**, Emmanuel U. Mapesa, Wilhelm Kossack, Friedrich Kremer
- B15 On the nature of adsorption sites for CO₂ in MOF Zn₂(bdc)₂dabco
*Mikuláš Peksa, Sareeya Bureekaew, Rochus Schmid, Jan Lang**, Frank Stallmach
- B16 Molecular dynamics investigation of the transport of hydrogen in ZIF-7
*Pooneh Pilvar**, Siegfried Fritzsche, Jürgen Caro, Wolfhard Janke
- B17 Polymer translocation through a nanopore: impact of fluctuations on dynamical scaling
*Vakhtang G. Rostiashvili**, Johan L. Dubbeldam, Andrey Milchev, Thomas A. Vilgis
- B18 Exploring diffusion and reaction in nanoporous catalysts by IR micro-imaging
*Tobias Titze**, Christian Chmelik, Dirk Enke, Roger Gläser, Jens Kullmann, Jörg Kärger, Lutz Prager, Jens Weitkamp

B19 Single-particle and ensemble diffusivities – Test of ergodicity

Florian Feil, Sergej Naumov, Jens Michaelis, Rustem Valiullin, Dirk Enke, Christoph Bräuchle, Jörg Kärger*

B20 Correlating phase state and transport in hierarchical mesoporous materials

*Philipp Zeigermann *, Dirk Mehlhorn, Jörg Kärger, Rustem Valiullin*

C – Fluctuations, Optical Traps, Hot Colloids

C1 Resonant optical tweezers with anti-reflection coated titania microspheres

Mohammad K. Abdosamadi, Anita Jannasch, Erik Schäffer*

C2 Gold nanostructure assisted thermophoretic trapping of single nano-objects

Marco Braun, Frank Cichos*

C3 Effective time-dependent temperature in hot Brownian motion

Gianmaria Falasco, Manuel V. Gnann, Daniel Rings, Dipanjan Chakraborty, Klaus Kroy*

D – Dynamics in Social and Animal Systems

D1 Two-step memory within Continuous Time Random Walk

Tomasz Gubiec, Ryszard Kutner*

D2 Diffusion of ragweed under climate change. Cost benefit-analysis for reducing allergies

*Robert Richter, Uwe E. Berger, Stefan Dullinger, Franz Essl, Michael Leitner, Matthew Smith, Gero Vogl**

Poster Session II

Tuesday, August 27th, 2013, 11:50–14:30

Ground Floor, Faculty of Chemistry and Mineralogy

AII – Biophysics and Single Molecules II

- A20 Diffusion and freezing transition of rod-like DNA origami on freestanding lipid membranes
*Eugene P. Petrov**, Aleksander Czogalla, Dominik J. Kauert, Ralf Seidel, Petra Schwille
- A21 Translational and rotational diffusion of semiflexible DNA polymers and rod-like *fd* virus particles on weakly charged freestanding cationic lipid membranes
*Eugene P. Petrov**, Christoph Herold, Petra Schwille
- A22 Simulation of diffusion in a crowded environment: the application of the Dynamic Lattice Liquid Model (DLL)
*Piotr Polanowski**, Andrzej Sikorski
- A23 Self-diffusion in a macroscopically aligned lyotropic hexagonal phase templated hydrogel
*Scott A. Willis, Gary R. Dennis, Gang Zheng, William S. Price**
- A24 Stochastic fluctuations of vesicles – extracting material parameters from incomplete projected information
*S. Alex Rautu**, George Rowlands, Matthew S. Turner
- A25 Wanted: Scalable tracers for diffusion
Michael J. Saxton
- A26 Internal friction of a migrating Holliday junction
*Hergen Brutzer, Alexander Huhle, Daniel Klaue, Ralf Seidel**
- A27 Protein diffusion on DNA
*Jasmina Dikic, Georgij Kostiuik, Virginijus Siksnys, Ralf Seidel**
- A28 Tracing molecular propagation in dextran solution by pulsed field gradient NMR
*Alexander Shakhov**, Jörg Kärger, Rustem Valiullin
- A29 Interference reflection microscopy to visualize sub-diffraction limited objects in 3D
*Steve Simmert**, Erik Schäffer
- A30 Dynamics of single DNA molecules in spatial confinement
*Evgeni Sperling**, Ronny Sczech, Michael Mertig
- A31 Rapid internal contraction boosts DNA friction
*Oliver Otto, Sebastian Sturm**, Nandanai Laohakunakorn, Ulrich Keyser, Klaus Kroy
- A32 Integrative optical imaging of molecular diffusion in strong light scattering brain tissue
*Lian Tao**, Anna Tao, Robert G. Thorne, Charles Nicholson

E – Active Brownian Motion

- E1 Individually tunable micromachines driven by laser induced self propelled thermophoresis
*Andreas Bregulla**, *Haw Yang*, *Frank Cichos*
- E2 Suppressing rotational diffusion of Janus particles by surface modifications for directed thermophoretic motion
*Katrin Günther**, *Andreas Bregulla*, *Martin Bönsch*, *Frank Cichos*, *Michael Mertig*
- E3 Correlated thermal motion of two liquid Pb inclusions on a dislocation in an Al-based alloy
*Sergei I. Prokofjev**, *Erik Johnson*, *Ulrich Dahmen*

F – Diffusion in Material Science

- F1 Modelling the oxygen diffusion profile in St 707 non evaporable getter material
*Sefer Avdiaj**, *Fisnik Aliaj*, *Naim Sylva*
- F2 Unconsolidated material characteristics obtained by PFGNMR using (two) different probe molecules
Bård A. Bendiksen, *Espen H. Blokkdal**, *Eddy W. Hansen*
- F3 Theoretical investigation of one- two- and three-dimensional Li diffusion in solids
*Thomas Bredow**, *Mazharul M. Islam*
- F4 Extreme mobility: low-temperature NMR probes highly diffusive Li⁺ ions in argyrodite-type Li₆PSe₅Cl and Li₆PS₅Br
*Viktor Epp**, *Özgül Gün*, *Hans-Jörg Deiseroth*, *Martin Wilkening*
- F5 Ion and water mobility in hydrated Li-LSX zeolite studied by ¹H, ⁶Li and ⁷Li NMR spectroscopy and diffusometry
*Dieter Freude**, *Steffen Beckert*, *Frank Stallmach*, *Jörg Kärger*, *Jürgen Haase*
- F6 Diffusion and self-avoiding walks on percolation clusters
*Niklas Fricke**, *Wolfhard Janke*
- F7 Determining surface diffusion properties from signal fluctuations
*Susanne Hahne**, *Philipp Maass*
- F8 Thermal diffusivity measurements with a single nanoparticle
*André Heber**, *Markus Selmke*, *Frank Cichos*
- F9 Determination of eigenvalues of the diffusion tensor in anisotropic system with spatial orientation change
*Mario Heidernätsch**, *Günter Radons*
- F10 Propagation of solid-liquid interfaces under disordered confinements
*Daria Kondrashova**, *Philipp Zeigermann*, *Rustem Valiullin*

- F11 Water permeation across lipid bilayers studied by pulsed field gradient NMR
*Frank Lange**, *Jan-Nicolas Leiste*, *Ruth Bärenwald*, *Kay Saalwächter*
- F12 IR Micro-imaging of mesoporous silicon as a model system for the investigation of hysteresis phenomena
*Alexander Lauerer**, *Philipp Zeigermann*, *Jörg Lenzner*, *Christian Chmelik*, *Rustem Valiullin*, *Jörg Kärger*
- F13 Dependence of the relaxation time T_2 on a fluid flow velocity in a porous media
Valentin Loskutov
- F14 Diffusion of CO₂ in ion-exchanged zeolites Rho studied by the ZLC technique
*Enzo Mangano**, *Stefano Brandani*, *Magdalena M. Lozinska*, *Paul A. Wright*
- F15 Diffusion in mesoporous zeolites
*Dirk Mehlhorn**, *Rustem Valiullin*, *Jörg Kärger*, *Ryong Ryoo*
- F16 Carbon Molecular Sieves – a kinetic study
*Andreas Möller**, *Joachim Guderian*, *Marcus Lange*, *Jens Möllmer*
- F17 Application of a steady states transport model to condensation of water droplets on a substrate
*Hannes Nagel**, *Jürgen Vollmer*, *Wolfhard Janke*
- F18 On the question of subaging in slow non-equilibrium dynamics
*Hendrik Pils**, *Philipp Maass*
- F19 Formation of α -(Ti) phase on grain boundaries in Ti-Co alloys
Alena S. Gornakova, *Sergei I. Prokofjev**, *Boris B. Straumal*
- F20 MD simulations of 1,4 - polybutadiene at graphite surfaces
*Mathieu Solar**, *Leonid Yelash*, *Peter Virnau*, *Kurt Binder*, *Wolfgang Paul*
- F21 Studies of atomic scale diffusion by x-ray photon correlation spectroscopy
*Markus Stana**, *Michael Leitner*, *Manuel Ros*, *Bogdan Sepiol*
- F22 Guest molecule diffusion and conformation influenced by local liquid crystal structure
*Daniela Täuber**, *Kathrin Radscheit*, *Rafael Camacho*, *Ivan Scheblykin*, *Christian von Borczyskowski*
- F23 Kinetic peculiarities of two-component diffusion saturation of titanium under rarefied nitrogen-oxygen-containing medium
Yaroslav Matychak, *Oleh Tkachuk**, *Iryna Pohrelyuk*, *Viktor Fedirko*
- F24 A combined sparse sampling of time-gradient domain for NMR diffusometry and relaxometry
*Mateusz Urbańczyk**, *Wiktor Koźmiński*, *Krzysztof Kazimierczuk*
- F25 Diffusion in Li_xNa_{2-x}Ti₆O₁₃ investigated with impedance spectroscopy
*Kai Volgmann**, *Katharina Bösebeck*, *Paul Heitjans*

F26 ^7Li ion diffusion in isotope-diluted glassy $\text{Li}_2\text{Si}_3\text{O}_7$ — the generation of pure spin-3/2 spin-alignment NMR echoes

Dominik Wohlmuth, Viktor Epp, Ute Bauer, Anna-Maria Welsch, Harald Behrens, Martin Wilkening*

F27 Condensation of a lattice gas in three dimensions

Johannes Zierenberg, Micha Wiedenmann, Wolfhard Janke*