

## Dynamics and Statistical Physics Division Fachverband Dynamik und Statistische Physik (DY)

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The Dynamics and Statistical Physics Division covers theoretical and experimental activities in all areas of statistical physics, quantum dynamics and many-body systems, nonlinear dynamics and pattern formation, data analysis and machine learning as well as active matter, fluid physics, soft matter and complex fluids. The DY section has strong links and joint sessions with the sections of Biological Physics (BP), Chemical Physics and Polymers (CPP), Socio- and Econophysics (SOE), and Low Temperatures (TT).

### Overview of Invited Talks and Sessions (Lecture halls MOL213, ZEU147, ZEU160, and ZEU250; Poster P1)

#### Invited Talks

DY 2.1	Mon	9:30–10:00	HSZ 03	<b>Enhanced variational Monte Carlo for Rydberg atom arrays</b> — •STEFANIE CZISCHEK
DY 2.2	Mon	10:00–10:30	HSZ 03	<b>Data mining the output of quantum simulators – from critical behavior to algorithmic complexity</b> — •MARCELLO DALMONTE
DY 2.3	Mon	10:30–11:00	HSZ 03	<b>Reinforcement learning for quantum technologies</b> — •FLORIAN MARQUARDT
DY 2.4	Mon	11:00–11:30	HSZ 03	<b>Machine learning of phase transition</b> — •CHRISTOF WEITENBERG
DY 5.1	Mon	9:30–10:00	MOL 213	<b>Extreme events, entropies and instantons for turbulence and water waves</b> — •JOACHIM PEINKE, ANDRÉ FUCHS, MATTHIAS WÄCHTER
DY 8.1	Mon	12:30–13:00	ZEU 250	<b>Novel phenomena and analysis methods in oscillator networks: higher-order interactions, higher-order averaging, and inference</b> — •HIROSHI KORI
DY 10.6	Mon	16:30–17:00	ZEU 160	<b>Long-range communications enable the hierarchical self-organization of active matter</b> — •IGOR ARONSON, ALEXANDER ZIEPKE, IVAN MARYSHEV, ERWIN FREY
DY 11.1	Mon	15:00–15:30	ZEU 250	<b>The challenge of structured disorder in statistical physics</b> — •MARC MEZARD
DY 11.2	Mon	15:30–16:00	ZEU 250	<b>The emergence of concepts in shallow neural-networks</b> — •ELENA AGLIARI
DY 11.3	Mon	16:00–16:30	ZEU 250	<b>Adaptive Kernel Approaches to Feature Learning in Deep Neural Networks</b> — •ZOHAR RINGEL
DY 11.5	Mon	17:00–17:30	ZEU 250	<b>Analysing the dynamics of message passing algorithms</b> — •MANFRED OPPER, BURAK CAKMAK
DY 11.6	Mon	17:30–18:00	ZEU 250	<b>Deep Learning Theory Beyond the Kernel Limit</b> — •CENGIZ PEHLEVAN
DY 14.1	Tue	9:30–10:00	MOL 213	<b>Unraveling structural and dynamical features in glassy fluids using machine learning</b> — •LAURA FILION, FRANK SMALLENBURG, RINSKE ALKEMADE
DY 25.1	Wed	9:30–10:00	MOL 213	<b>Many-body localization from Hilbert- and real-space points of view</b> — •IVAN KHAYMOVICH, GIUSEPPE DE TOMASI, FRANK POLLMANN, SIMONE WARZEL
DY 26.1	Wed	9:30–10:00	ZEU 160	<b>More is different: High-throughput 3D tracking reveals bacterial navigation strategies</b> — •KATJA TAUTE

DY 26.2	Wed	10:00–10:30	ZEU 160	<b>Variability and heterogeneity in natural swarms</b> — ●GIL ARIEL
DY 26.5	Wed	11:15–11:45	ZEU 160	<b>Superstatistical Analysis and Modelling of Complex Dynamical Systems</b> — ●CLAUS METZNER, CHRISTOPH MARK, BEN FABRY, PATRICK KRAUSS, ACHIM SCHILLING, MAXIMILIAN TRAXDORF, HOLGER SCHULZE
DY 27.1	Wed	9:30–10:00	ZEU 250	<b>Evolution in changing environments and driven disordered systems</b> — ●JOACHIM KRUG, SUMAN DAS, MUHITTIN MUNGAN
DY 37.6	Thu	11:00–11:30	MOL 213	<b>Power law error growth rates – a dynamical mechanism for a strictly finite prediction horizon in weather forecasts</b> — HYNEK BEDNAR, JONATHAN BRISCH, BURAK BUDANUR, ●HOLGER KANTZ
DY 38.1	Thu	9:30–10:00	ZEU 160	<b>Acoustically propelled nano- and microparticles: From fundamentals to applications</b> — ●RAPHAEL WITTKOWSKI
DY 56.5	Fri	10:30–11:00	ZEU 160	<b>Transport and self-organization in living fluids</b> — ●MATTHIAS WEISS

### Invited Talks of the joint Symposium Dynamics of Opinion Formation – From Quorum Sensing to Polarization (SYOF)

See SYOF for the full program of the symposium.

SYOF 1.1	Mon	9:30–10:00	HSZ 01	<b>Towards understanding of the social hysteresis – insights from statistical physics</b> — ●KATARZYNA SZNAJD-WERON
SYOF 1.2	Mon	10:00–10:30	HSZ 01	<b>Polarization in attitude distributions from surveys and models of continuous opinion dynamics</b> — ●JAN LORENZ, MARTIN GESTEFELD
SYOF 1.3	Mon	10:30–11:00	HSZ 01	<b>Collective patterns and stable misunderstandings in networks striving for consensus without a common value system</b> — ●JOHANNES FALK, EDWIN EICHLER, KATJA WINDT, MARC-THORSTEN HÜTT
SYOF 1.4	Mon	11:15–11:45	HSZ 01	<b>A yet undetected cognitive bias, revealed by opinion dynamics simulations</b> — ●GUILLAUME DEFFUANT
SYOF 1.5	Mon	11:45–12:15	HSZ 01	<b>Extreme switches in kinetic exchange models of opinion.</b> — ●PARONGAMA SEN, KATHAKALI BISWAS

### Invited Talks of the joint Symposium SKM Dissertation Prize 2023 (SYSD)

See SYSD for the full program of the symposium.

SYSD 1.1	Mon	9:30–10:00	HSZ 04	<b>Diffusion of antibodies in solution: from individual proteins to phase separation domains</b> — ●ANITA GIRELLI
SYSD 1.2	Mon	10:00–10:30	HSZ 04	<b>Intermediate Filament Mechanics Across Scales</b> — ●ANNA V. SCHEPERS
SYSD 1.3	Mon	10:30–11:00	HSZ 04	<b>Ultrafast Probing and Coherent Vibrational Control of a Surface Structural Phase Transition</b> — ●JAN GERRIT HORSTMANN
SYSD 1.4	Mon	11:00–11:30	HSZ 04	<b>Electro-active metasurfaces employing metal-to-insulator phase transitions</b> — ●JULIAN KARST
SYSD 1.5	Mon	11:30–12:00	HSZ 04	<b>The role of unconventional symmetries in the dynamics of many-body systems</b> — ●PABLO SALA

### Invited Talks of the joint Symposium Physics of Fluctuating Paths (SYFP)

See SYFP for the full program of the symposium.

SYFP 1.1	Tue	9:30–10:00	HSZ 01	<b>Time at which a stochastic process achieves its maximum</b> — ●SATYA MAJUMDAR
SYFP 1.2	Tue	10:00–10:30	HSZ 01	<b>Fluctuations and molecule-spanning dynamics of single Hsp90 proteins on timescales from nanoseconds to days</b> — ●THORSTEN HUGEL
SYFP 1.3	Tue	10:30–11:00	HSZ 01	<b>Path reweighting for Langevin dynamics</b> — ●BETTINA KELLER
SYFP 1.4	Tue	11:15–11:45	HSZ 01	<b>Out-of-equilibrium dynamics of trapped Brownian particles</b> — ●RAUL A. RICA
SYFP 1.5	Tue	11:45–12:15	HSZ 01	<b>Thermodynamics of Clocks</b> — ●PATRICK PIETZONKA

## Invited Talks of the joint Symposium Topology in Quantum and Classical Physics – From Topological Insulators to Active Matter (SYQC)

See SYQC for the full program of the symposium.

SYQC 1.1	Wed	15:00–15:30	HSZ 01	<b>Topological magnetic whirls for computing</b> — ●KARIN EVERSCHOR-SITTE
SYQC 1.2	Wed	15:30–16:00	HSZ 01	<b>Topological waves from solids to geo/astrophysical flows</b> — ●PIERRE DELPLACE, ANTOINE VENAILLE, NICOLAS PEREZ, GUILLAUME LAIBE, ARMAND LECLERC, MANOLIS PERROT, BRAD MARSTON
SYQC 1.3	Wed	16:00–16:30	HSZ 01	<b>Topological Phase Transitions in Population Dynamics</b> — ●ERWIN FREY
SYQC 1.4	Wed	16:45–17:15	HSZ 01	<b>Topological invariants protect robust chiral currents in active matter</b> — ●EVELYN TANG
SYQC 1.5	Wed	17:15–17:45	HSZ 01	<b>Topological defects in biological active matter</b> — ●AMIN DOOSTMOHAMMADI

## Sessions

DY 1.1–1.3	Sun	16:00–18:15	HSZ 01	<b>Tutorial: Physics Meets Machine Learning (joint session DY/TUT/TT)</b>
DY 2.1–2.9	Mon	9:30–13:00	HSZ 03	<b>Focus Session: Physics Meets ML I – Machine Learning for Complex Quantum Systems (joint session TT/DY)</b>
DY 3.1–3.12	Mon	9:30–13:00	TOE 317	<b>Active Matter I (joint session BP/ CPP/DY)</b>
DY 4.1–4.11	Mon	9:30–12:30	ZEU 250	<b>Pattern Formation, Delay and Nonlinear Stochastic Systems</b>
DY 5.1–5.9	Mon	9:30–12:15	MOL 213	<b>Fluid Physics: Turbulence and Convection</b>
DY 6.1–6.11	Mon	10:00–13:00	ZEU 160	<b>Statistical Physics: General I</b>
DY 7.1–7.10	Mon	10:00–12:45	ZEU 147	<b>Granular Matter and Contact Dynamics</b>
DY 8.1–8.1	Mon	12:30–13:00	ZEU 250	<b>Invited Talk: Dynamics of Networks (joint session DY/SOE)</b>
DY 9.1–9.12	Mon	14:00–17:15	MOL 213	<b>Quantum Dynamics, Decoherence and Quantum Information</b>
DY 10.1–10.11	Mon	15:00–18:15	ZEU 160	<b>Active Matter II (joint session DY/BP/ CPP)</b>
DY 11.1–11.8	Mon	15:00–18:30	ZEU 250	<b>Focus Session: Physics Meets ML II – Understanding Machine Learning as Complex Interacting Systems (joint session DY/TT)</b>
DY 12.1–12.13	Tue	9:30–13:15	HSZ 204	<b>Nonequilibrium Quantum Many-Body Systems I (joint session TT/DY)</b>
DY 13.1–13.11	Tue	9:30–12:30	TOE 317	<b>Active Matter III (joint session BP/ CPP/DY)</b>
DY 14.1–14.1	Tue	9:30–10:00	MOL 213	<b>Invited Talk: Machine Learning and Complex Fluids</b>
DY 15.1–15.1	Tue	9:30–10:00	ZEU 260	<b>Physics of Contagion Processes I (joint session SOE/DY)</b>
DY 16.1–16.11	Tue	10:00–13:00	MOL 213	<b>Complex Fluids and Soft Matter (joint session DY/ CPP)</b>
DY 17.1–17.10	Tue	10:00–12:45	ZEU 160	<b>Machine Learning in Dynamics and Statistical Physics I</b>
DY 18.1–18.8	Tue	10:00–12:15	ZEU 147	<b>Nonlinear Dynamics, Synchronization and Chaos</b>
DY 19.1–19.3	Tue	10:00–10:45	ZEU 260	<b>Physics of Contagion Processes II (joint session SOE/DY)</b>
DY 20.1–20.5	Tue	11:00–12:15	ZEU 260	<b>Networks: From Topology to Dynamics I (joint session SOE/DY)</b>
DY 21.1–21.5	Tue	14:00–15:15	MOL 213	<b>Quantum Chaos and Coherent Dynamics</b>
DY 22.1–22.5	Tue	14:00–15:15	ZEU 160	<b>Machine Learning in Dynamics and Statistical Physics II</b>
DY 23.1–23.5	Tue	14:00–15:15	ZEU 250	<b>Statistical Physics: General II</b>
DY 24.1–24.4	Tue	14:00–15:00	ZEU 147	<b>Glasses and Glass Transition (joint session DY/ CPP)</b>
DY 25.1–25.12	Wed	9:30–13:00	MOL 213	<b>Many-Body Quantum Dynamics (joint session DY/TT)</b>
DY 26.1–26.10	Wed	9:30–13:00	ZEU 160	<b>Focus Session: From Inter-individual Variability to Heterogeneous Group Dynamics and Disorder in Active Matter (joint session DY/BP/ CPP)</b>
DY 27.1–27.12	Wed	9:30–13:00	ZEU 250	<b>Statistical Physics: Far From Equilibrium I</b>
DY 28.1–28.5	Wed	9:30–11:45	ZEU 260	<b>Focus Session: Critical Transitions in Society, Economy, and Nature (joint session SOE/DY)</b>
DY 29.1–29.11	Wed	10:00–13:00	ZEU 147	<b>Wetting, Droplets and Microfluidics (joint session DY/ CPP)</b>
DY 30.1–30.13	Wed	15:00–18:30	HSZ 204	<b>Nonequilibrium Quantum Many-Body Systems II (joint session TT/DY)</b>
DY 31.1–31.12	Wed	15:00–18:15	MOL 213	<b>Microswimmers and Fluid Physics of Life (joint session DY/ CPP)</b>

DY 32.1–32.12	Wed	15:00–18:15	ZEU 160	<b>Focus Session: Physics of Fluctuating Paths (joint session DY/CPP)</b>
DY 33.1–33.6	Wed	15:00–16:30	ZEU 250	<b>Biologically Inspired Statistical Physics (joint session DY/BP)</b>
DY 34.1–34.6	Wed	16:45–18:15	ZEU 250	<b>Statistical Physics: Far From Equilibrium II</b>
DY 35.1–35.12	Thu	9:30–13:00	TOE 317	<b>Statistical Physics of Biological Systems I (joint session BP/DY)</b>
DY 36.1–36.13	Thu	9:30–13:00	MER 02	<b>Wetting, Fluidics and Liquids at Interfaces and Surfaces I (joint session CPP/DY)</b>
DY 37.1–37.8	Thu	9:30–12:00	MOL 213	<b>Data Analytics of Complex Dynamical Systems (joint session DY/SOE)</b>
DY 38.1–38.12	Thu	9:30–13:00	ZEU 160	<b>Active Matter IV (joint session DY/BP/CPP)</b>
DY 39.1–39.1	Thu	9:30–10:00	ZEU 260	<b>Networks: From Topology to Dynamics II (joint session SOE/DY)</b>
DY 40.1–40.9	Thu	10:00–12:30	ZEU 250	<b>Stochastic Thermodynamics</b>
DY 41.1–41.3	Thu	10:00–10:45	ZEU 260	<b>Networks: From Topology to Dynamics III (joint session SOE/DY)</b>
DY 42.1–42.17	Thu	13:00–16:00	P1	<b>Poster: Active Matter, Soft Matter, Fluids</b>
DY 43.1–43.22	Thu	13:00–16:00	P1	<b>Poster: Quantum Dynamics and Many-Body Systems</b>
DY 44.1–44.22	Thu	13:00–16:00	P1	<b>Poster: Statistical Physics</b>
DY 45.1–45.16	Thu	13:00–16:00	P1	<b>Poster: Nonlinear Dynamics, Pattern Formation and Networks</b>
DY 46.1–46.10	Thu	13:00–16:00	P1	<b>Poster: Machine Learning and Data Analytics</b>
DY 47.1–47.5	Thu	15:00–16:15	MER 02	<b>Wetting, Fluidics and Liquids at Interfaces and Surfaces II (joint session CPP/DY)</b>
DY 48.1–48.9	Thu	15:00–17:30	MOL 213	<b>Dynamics and Chaos in Many-Body Systems I (joint session DY/TT)</b>
DY 49.1–49.10	Thu	15:00–17:45	ZEU 160	<b>Critical Phenomena and Phase Transitions</b>
DY 50.1–50.2	Thu	15:00–15:30	ZEU 260	<b>Evolutionary Game Theory (joint session SOE/DY)</b>
DY 51	Thu	18:00–19:00	ZEU 160	<b>Members' Assembly</b>
DY 52.1–52.9	Fri	9:30–12:00	BAR Schö	<b>Statistical Physics of Biological Systems II (joint session BP/DY)</b>
DY 53.1–53.8	Fri	9:30–12:00	TOE 317	<b>Active Matter V (joint session BP/CPP/DY)</b>
DY 54.1–54.12	Fri	9:30–13:00	MER 02	<b>Complex Fluids and Colloids, Micelles and Vesicles (joint session CPP/DY)</b>
DY 55.1–55.11	Fri	9:30–12:30	MOL 213	<b>Dynamics and Chaos in Many-Body Systems II (joint session DY/TT)</b>
DY 56.1–56.11	Fri	9:30–12:45	ZEU 160	<b>Brownian Motion and Anomalous Diffusion</b>
DY 57.1–57.8	Fri	9:30–11:45	ZEU 250	<b>Networks: From Topology to Dynamics IV (joint session DY/SOE)</b>

## Members' Assembly of the Dynamics and Statistical Physics Division

Thursday 18:00–19:00 ZEU 160

- Report
- Elections
- Future activities of DY
- Any other business