

Half a Century of the Kuramoto Model: Explaining Emergent Order in Time and Space

860. WE-Heraeus-Seminar

28. June – 03 July 2026

at the Physikzentrum Bad Honnef, Germany

**WILHELM UND ELSE
HERAEUS-STIFTUNG**



Program

Sunday, 28 June 2026

17:00 – 21:00 Registration

18:00 *BUFFET SUPPER and informal get-together*

Monday, 29 June 2026

08:00 *BREAKFAST*

09:00 – 09:30 Scientific organizers **Opening**

09:30 – 10:00 Arkady Pikovsky **Properties of finite Kuramoto-Sakaguchi ensembles: chaos, coherence, reliability**

10:00 – 10:30 Ulrike Feudel **Global stability of complex networks of Kuramoto (-like) oscillators**

10:30 – 11:00 *COFFEE BREAK*

11:00 – 11:30 Igor Belykh **How time delay generates inertia and triadic coupling in Kuramoto networks**

11:30 – 12:00 Oleksandr Burylko **Bifurcations and catastrophes in a frustrated spin system on a ring**

12:00 *LUNCH*

Program

Monday, 29 June 2026

14:00 – 14:30	Hugues Chaté	The Kuramoto-Vicsek model
14:30 – 15:00	Carlo Laing	Neural field models with delays
15:00 – 15:30	<i>COFFEE BREAK</i>	
15:30 – 16:00	Mehrnaz Anvari	Finite size effect in Kuramoto oscillators with second order dynamics
16:00 – 16:30	Shamik Gupta	Synchronization with annealed disorder and higher-harmonic interactions in arbitrary dimensions: When two dimensions are special
16:30 – 17:00	Poster flashes	
17:00 – 18:00	Poster session	
18:00	<i>DINNER</i>	

Program

Tuesday, 30 June 2026

08:00	<i>BREAKFAST</i>	
09:00 – 09:30	Hildegard Meyer-Ortmanns	The Kuramoto Model: From local to repressive to non-reciprocal couplings
09:30 – 10:00	Albert Diaz-Guilera Conrad J. Pérez-Vicente	Beyond synchronization: pattern formation in Kuramoto-type systems
10:00 – 10:30	Antonio Politi	Collective dynamics in the presence of long-range interactions
10:30 – 11:00	<i>COFFEE BREAK</i>	
11:00 – 11:30	Katharina Krischer	When amplitude counts: Collective behavior of globally coupled Stuart-Landau oscillators
11:30 – 12:00	Iván León	The emergence of chaos in the Kuramoto model with random interactions
12:00 – 12:30	Stefano Iubini	Internal reliability and antireliability in dynamical networks
12:30	<i>LUNCH</i>	

Program

Tuesday, 30 June 2026

14:00 – 14:30	Bard Ermentrout	Frequency plateaus revisited
14:30 – 15:00	Bob Rink	Reconstructing resonant interactions in oscillator networks from noisy time series
15:00 – 15:30	<i>COFFEE BREAK</i>	
15:30 – 16:00	Hiroshi Kori	Rethinking phase models: Data-driven pathways to synchronization analysis
16:00 – 16:30	Amit Pando	Synchronization of oscillator lattices with quenched disorder using coupled laser arrays
16:30 – 17:00	Poster flashes	
17:00 – 18:00	Poster session	
18:00	<i>DINNER</i>	

Program

Wednesday, 01 July 2026

08:00	<i>BREAKFAST</i>	
09:00 – 09:30	Serhiy Yanchuk	Singular basins in multiscale systems
09:30 – 10:00	Oleh Omelchenko	Mean-field approach to finite-size fluctuations in coupled oscillator systems
10 :00 – 10:30	Diego Pazó	Low-dimensional reductions and the analytic continuation problem
10:30 – 11:00	<i>COFFEE BREAK</i>	
11:00 – 11:30	Hiroya Nakao	Phase reduction approach to control and design of coupled oscillators networks
11:30 – 12:00	Rok Cestnik	Two-phase quadratic integrate-and-fire neurons: Exact low-dimensional description for ensembles of finite-voltage neurons
12:00 – 12:30	Matthias Wolfrum	Synchronization patterns with topologically protected incoherent spots
12:30	<i>LUNCH</i>	
14:00	Excursion	
18:00	<i>HERAEUS DINNER</i> (social event with cold & warm buffet with complimentary drinks)	

Program

Thursday, 02 July 2026

08:00	<i>BREAKFAST</i>	
09:00 – 09:30	Erik Martens	Lie meets network dynamics: Exact macroscopic descriptions
09:30 – 10:00	Victor Buendía Ruiz-Azuaga	Mesoscopic theory for coupled stochastic oscillators
10:00 – 10:30	Christian Bick	Higher-order phase interactions, phase reduction, and collective dynamics
10:30 – 11:00	<i>COFFEE BREAK</i>	
11:00 – 11:30	Istvan Z. Kiss	Collective dynamics of electrochemical oscillator networks described by higher order Kuramoto models
11:30 – 12:00	Bastian Pietras	Exact mean-field model for networks of spiking neurons with quadratic spike-frequency adaptation
12:00 – 12:30	Niamh Fennelly	A Novel Framework for Non-Local Hebbian Learning in Neural Fields
12:30	<i>LUNCH</i>	

Program

Thursday, 02 July 2026

14:00 – 14:30	Xiaozhu Zhang	Fluctuation-Induced Patterns in Power Networks — Localization, Resonances and Extreme Events
14:30 – 15:00	Holger Kantz	Transient times till synchronization in Reservoir Computing
15:00 – 15:30	<i>COFFEE BREAK</i>	
15:30 – 16:00	Markus Bär	Hydrodynamic synchronization of elastic cilia: Stability and dynamics of metachronal waves
16:00 – 16:30	Tomer Hacohen	Robustness to disorder using complex coupling in laser arrays
16:30 – 18:00	Discussion	
19:00	<i>DINNER</i>	

Program

Friday, 02 July 2026

08:00	<i>BREAKFAST</i>	
09:00 – 09:30	Yuri Maistrenko	Chaotic switching in Kuramoto model with inertia
09:30 – 10:00	Pau Clusella Coberó	From chimeras to extensive chaos in networks of heterogeneous Kuramoto oscillator populations
10:00 – 10:30	Alessandro Torcini	The π -transition : A tipping point for the Kuramoto model with triadic repulsive interaction
10:30 – 11:00	<i>COFFEE BREAK</i>	
11:00 – 11:30	Sangita Dutta	Double explosive synchronization transition in hypergraphs
11:30 – 12:00	Ernest Montbrió	Synchronization modes in bipartite oscillator networks
12:00 – 12:20	Scientific organizers	Closing remarks
12:20	<i>LUNCH</i>	

End of the seminar and departure