

Symposium Fluids with Broken Time-Reversal Symmetry: Odd/Hall Viscosity between Active Matter and Electron Flows (SYBS)

jointly organised by

the Dynamics and Statistical Physics Division (DY),

the Chemical and Polymer Physics Division (CPP),

the Magnetism Division (MA), and

the Low Temperature Physics Division (TT)

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Viscosity is a fundamental property of fluids and an important physical quantity characterizing resistance to flow and energy dissipation. While time-reversal symmetry holds in conventional fluids, its violation can lead to striking phenomena, one of which is the emergence of a dissipationless transport coefficient called odd viscosity. Odd viscosity, also known as Hall viscosity, was originally proposed by Avron et al., as a quantized observable in electron fluids with a magnetic field. Since this seminal work, odd viscosity has been studied in various systems, such as 2D electron fluids, fractional Hall fluids, and ionic crystals. Although odd viscosity was also known in plasma physics, it was largely overlooked in fluid dynamics, mainly due to the technical challenges involved in its experimental realization. In recent years, however experiments in driven colloidal systems led to a surge of interest in odd viscosity in the active matter community. In parallel, our understanding of odd phenomena was advanced by continuum theories with many novel exact solutions. Major open questions in the field include the microscopic mechanisms that lead to odd viscosity, its experimental manifestations, the transition from two- to three-dimensional systems, and the effect of odd viscosity on hydrodynamic phenomena at different length scales, ranging from microrheology to turbulent flows. This Symposium will connect the wider condensed matter and active matter physics communities with recent theoretical advances in odd viscosity.

Overview of Invited Talks and Sessions

(Lecture hall HSZ/AUDI)

Invited Talks

SYBS 1.1	Tue	9:30–10:00	HSZ/AUDI	Odd viscosity in three-dimensional fluids: flows, wakes, and eddies — •TALI KHAIN
SYBS 1.2	Tue	10:00–10:30	HSZ/AUDI	Odd viscosity in two-dimensional hydrodynamic electron transport — •IGOR GORNYI, DMITRY POLYAKOV
SYBS 1.3	Tue	10:30–11:00	HSZ/AUDI	Odd slip on chiral active surfaces — •ANDREJ VILFAN, YUTO HOSAKA
SYBS 1.4	Tue	11:15–11:30	HSZ/AUDI	Parity-odd transport in electron fluids — •JOHANNA ERDMENGER
SYBS 1.5	Tue	11:30–11:45	HSZ/AUDI	Curved Odd Elasticity — LAZAROS TSALOUKIDIS, YUAN ZHOU, JACK BINYSH, NIKTA FAKHRI, CORENTIN COULAIS, •PIOTR SURÓWKA

Sessions

SYBS 1.1–1.5	Tue	9:30–11:45	HSZ/AUDI	Fluids with broken time-reversal symmetry: Odd/Hall viscosity between active matter and electron flows
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