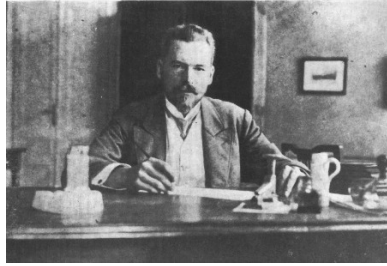


36th M. Smoluchowski Symposium on Statistical Physics: Soft Matter, Information Processing and Nonequilibrium Fluctuations



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Coarse-grained description of stochastic dynamics and field theoretic models for complex systems

Monday, 25 September 2023 17:05 (25 minutes)

The continuum field theoretic approach to describing a many-particle system has been very useful in understanding its thermodynamic and time-dependent behaviour. Our discussion will be on the fluctuating hydrodynamic description used to study the behaviour of a system of passive systems and the active matter of self-propelled particles. The dynamics are primarily formulated in terms of a set of collective modes of the system. Starting from a set of microscopic balance equations which are exact representations of the stochastic dynamics of a many particle system, the description with smooth Spatio-temporal dependencies follow. We demonstrate how the appearance of the self-propelling terms and the breaking of Galilean invariances in the equations for the active-matter hydrodynamics are linked to the microscopic dynamics of the individual units.

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