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SONDERKOLLOQUIUM

zur Ausschreibung – W2-Professur für theoretische Quanten-Vielteilchenphysik

5. Mai 2025 um 9:00 Uhr

BCTP, Wegelerstraße 10, Seminarraum I (2.019)

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Dr. Shu Zhang

Max-Planck-Institut für Physik komplexer Systeme (Dresden)

Multifaceted Spin Transport: From Many-Body Effects to Open Quantum Systems

Magnetism in solids emerges from the interplay between quantum mechanics and many-body interactions. The study of spin transport in magnetic systems provides deep insights into their underlying excitations and correlations, and also holds promise for future spin-based technologies. In this talk, I present a multifaceted perspective on spin transport, highlighting complementary theoretical frameworks developed for distinct physical regimes. The first part focuses on geometrically frustrated magnets in the intermediate-temperature regime, where intrinsic many-body interactions and thermal fluctuations jointly give rise to a generic phenomenon of spin diffusion. The second part turns to spin dynamics in open quantum systems, where dissipation and environmental coupling fundamentally reshape transport behavior, with the prominent example of non-Hermitian and Liouvillian skin effects. Finally, I outline my future research directions aimed at uncovering novel transport phenomena in exotic magnetic systems and advancing our understanding of nonequilibrium spin dynamics, with a particular interest in interdisciplinary approaches bridging condensed matter physics and quantum optics.

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