

PHYSIKALISCHES KOLLOQUIUM

Wintersemester 2025/2026

Das Kolloquium findet (soweit nicht anders angegeben) **jeweils montags um 14:15 Uhr im Röntgen-Hörsaal** des Physikalischen Instituts, Hubland Campus Süd, Universität Würzburg **und online via Zoom** statt.

Zugangsdaten siehe <https://www.physik.uni-wuerzburg.de/aktuelles/veranstaltungen-aus-der-physik/physikalisches-kolloquium/>

08.12.2025

Vorstellungsvortrag im Rahmen des Habilitationsverfahrens

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Universal dynamics in driven quantum fluids

Abstract

The emergence of universal behaviors in systems far from equilibrium remains one of the most compelling challenges in modern physics. While equilibrium critical phenomena are well classified, their non-equilibrium counterparts, particularly in open, driven-dissipative quantum systems, are still not clearly understood.

In this talk, I will present our recent demonstration¹ that the Kardar-Parisi-Zhang (KPZ) universality class governs the stochastic roughening of condensate phases in two dimensions: the first such experimental observation. This is particularly striking, as 2D KPZ behavior cannot occur in equilibrium, making it a genuine hallmark of driven quantum matter. I will also present new research projects and goals that I am pursuing as part of my postdoctoral qualification. These include, how under different conditions, the KPZ universality can give way to other universality classes namely the Berezinskii-Kosterlitz-Thouless (BKT) class and the Edwards-Wilkins (EW) class, and the Kibble-Zurek mechanism (KZM), which predicts universal defect formation when a system is rapidly quenched across a critical point.

Together, these studies chart a roadmap for the discovery and classification of non-equilibrium phases in driven quantum fluids of light.

<https://doi.org/10.48550/arXiv.2506.15521>

Für die Dozentinnen bzw. Dozenten der Fakultät

Prof. Dr. Palffy-Buß, Prof. Dr. Klembt, Dr. Hammer, Hr. Baumbach, Fr. Schleicher