# Department of Physics • University of Cologne

## Upcoming Events • Theorie Kolloquium

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*Theorie Kolloquium*
**October 11, 16:30**
Seminar Room 0.03, ETP

Uwe Täuber, Virginia Tech

### Temperature Interfaces in the Katz-Lebowitz-Spohn Driven Lattice Gas

Contact Person: Sebastian Diehl | ical

We explore the intriguing spatial patterns that emerge in a two-dimensional spatially inhomogeneous Katz-Lebowitz-Spohn (KLS) driven lattice gas with attractive nearest-neighbor interactions. The domain is split into two regions with hopping rates governed by different temperatures T > T_c and T_c, respectively, where T_c indicates the critical temperature for phase ordering, and with the temperature boundaries oriented perpendicular to the drive. In the hotter region, the system behaves like the (totally) asymmetric exclusion processes (TASEP), and experiences particle blockage in front of the interface to the critical region. To explain this particle density accumulation near the interface, we have measured the steady-state current in the KLS model at T > T_c and found it to decay as 1/T. In analogy with TASEP systems containing "slow" bonds, transport in the high-temperature subsystem is impeded by the lower current in the cooler region, which tends to set the global stationary particle current value. This blockage is induced by the extended particle clusters, growing logarithmically with system size, in the critical region. We observe the density profiles in both high-and low- temperature subsystems to be similar to the well-characterized coexistence and maximal-current phases in (T)ASEP models with open boundary conditions, which are respectively governed by hyperbolic and trigonometric tangent functions. Yet if the lower temperature is set to T_c, we detect marked fluctuation corrections to the mean-field density profiles, e.g., the corresponding critical KLS power law density decay near the interfaces into the cooler region. If the temperature interface is aligned parallel to the drive, we observe the cooler region to act as an absorbing sink for particle transport, with blockages emerging at the subsystem boundaries.

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**November 08, 16:30**
Seminar Room 0.03, ETP

Seminar Day - SFB 1310

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