Phase Separation, Interfaces and Vicious Walkers in a Wedge. Exact Results from Field Theory

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October 16, 2016

Abstract

We give the exact theory of phase separation in a planar wedge, the prototypical example for the effects of substrate geometry on interfacial properties. We consider the basic case of a single interface, as well as that allowing for an intermediate wetting layer of a third phase. Using low energy properties of two-dimensional field theory we determine order parameter profiles and passage probabilities for interfaces with endpoints on the boundary. The fundamental origins of the wedge filling transition and of the property known as wedge covariance are explained. We also show that the interfaces enclosing an intermediate phase behave as trajectories of vicious walkers, whose passage probability emerges from an interesting mathematical structure involving self-Fourier functions.

Based on:

[1] G. Delfino and A.S., *Phase separation in a wedge. Exact results*, Physical Review Letters **113** (2014) 066101

[2] G. Delfino and A.S., *Multiple phases and vicious walkers in a wedge*, Nuclear Physics B **901** (2015) 430

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