



Center for Soft Matter and Biological Physics

Discussion Meeting

Dr. Ronald Dickman

(Universidade Federal de Minas Gerais, Brazil)

“Phase Diagram and Interfacial Instabilities in the Driven Widom-Rowlinson Lattice Gas”

Monday, August 2, 2021

4:00pm - 5:00pm

Virtual Zoom Link: <https://virginiatech.zoom.us/j/88910590010>

The Widom-Rowlinson lattice gas is a two-species model exhibiting phase separation above a critical density and, under a drive, remarkable properties such as lamellar ordering perpendicular to the drive, and kink singularities in the structure factor [1]. Initial studies of the high-density ordered phase were complicated by artifacts of the initial configuration. These are now eliminated using a new method in which particles are slowly added to the evolving system, allowing a pattern of the preferred wavelength to emerge spontaneously. This method enables detailed study of the sequence of transitions between stripe numbers with increasing system size at fixed drive and density, and a precise mapping of the boundary between disordered and ordered phases as reflected in the order parameter and the density of interfacial sites. We also analyze the instability of an interface oriented along the drive, characterized by an exponential-growth regime in interface undulations and systematic increase of the dominant wavelength.

1. R. Dickman and R.K.P. Zia, Phys Rev. E 97, 062126 (2018).

