Title: Homogeneity and stability of non-periodic ground states

We will discuss classical lattice-gas models without periodic ground states. Our two-dimensional models with finite-range interactions are based on Wang tiles (see for example [1]). One-dimensional infinite-range interaction models involve substitutions (Thue-Morse [2]) or Sturmian systems derived by rotations on the circle [3]. Such systems are microscopic toy model of quasicrystals. It is important to investigate their stability with respect to small perturbations of interactions (zero-temperature stability) and against thermal motions (low-temperature stability). The main open problem is the existence of two and three-dimensional non-periodic Gibbs states with finite-range interactions. We will explore connections between fast convergence to equilibrium of frequencies of patterns in non-periodic ground-state configurations and their stability [4]. Several examples and open problems will be presented.

Bibliography:

1. J. Miękisz, A microscopic model with quasicrystalline properties, J. Stat. Phys. 58: 1137-1149 (1990).

2. C. Gardner, J. Miękisz, C. Radin, and A. van Enter, Fractal symmetry in an Ising model, J. Phys. A.: Math. Gen. 22: L1019-L1023 (1989).

3. A. van Enter, H. Koivusalo, and J. Miękisz, Sturmian ground states in classical latticeÐgas models, J. Stat. Phys. 178: 832Ð844 (2020).

4. J. Miękisz, Classical lattice-gas models of quasicrystals, J. Stat. Phys. 97: 835-850 (1999).