Asymptotics of minimal discrete periodic energy problems

Douglas Hardin

(Vanderbilt University)

Abstract

Let L be a d-dimensional lattice in \mathbb{R}^d . For a parameter s > 0, we consider the asymptotics of N point configurations minimizing the L-periodic Riesz s-energy as the number of points N goes to infinity. In particular, we focus on the case 0 < s < d of long-range potentials where we establish that the minimal energy $E_s(L, N)$ is of the form $E_s(L, N) = C_0 N^2 + C_1 N^{1+s/d} + o(N^{1+s/d})$ as $N \to \infty$. The constants C_0 and C_1 depend only on s, d, and covolume of the lattice L.

This is joint work with Ed Saff, Brian Simanek and Yujian Su.