Kolloquium Mathematische Physik
Wintersemester 2013/14

Freitags, 31.01.2014, 16:15   Ort: V2-210

Alessandro Giuliani

University Roma 3

Stripe formation in frustrated systems with long-range interactions

The phenomenon of spontaneous pattern formation in interacting many body systems is still incompletely understood. A remarkable example of pattern formation is the emergence of periodic striped states, which is observed in a variety of different systems, ranging from magnetic films to manganites, high-temperature superconductors, MOSFETs, polymer suspensions, twinned martensites, Coulomb glasses and many others. The common microscopic feature of all such systems is the competition between a short-range attractive force, which favors a homogeneous magnetized ß tate, and a long-range repulsive one, which opposes such a tendency. The competition between these two effects induces the
system to find a compromise in the form of a collection of mesoscopic magnetized islands, alternating with different signs on the scale of the whole sample. The problem is to establish the optimal shapeand arrangement of such islands. In this talk I will review some of the conjectures and of the knownresults about this class of systems, and I will discuss a possible theoretical approach to the problem of proving the existence of periodic striped states, based on a combination of reection positivity and
localization into boxes. Joint work with J. Lebowitz, E. Lieb and R. Seiringer. r

Kontakt: baake@math.uni-bielefeld.de

http://www.math.uni-bielefeld.de