Temple University Mathematics Colloquium

Roland Roeder

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will speak on

Complex dynamics for the Lee–Yang zeros — study of a model magnetic material

ABSTRACT: In a classical work, Lee and Yang proved that zeros of certain polynomials (partition functions of Ising models) always lie on the unit circle. Distribution of these zeros control phase transitions in the model. It can be quite challenging to understand this distribution for the classical $\mathbb{Z}^2$ lattice. Instead, we consider a special "Migdal–Kadanoff hierarchical lattice", which can be viewed as a model magnetic material. In this case, the distribution of zeros can be described in terms of the dynamics of an explicit rational function in two variables. We show that the Yang–Lee zeros are organized in a transverse measure for a dynamical foliation on an invariant cylinder.

    This talk is aimed at a wide audience. Rather than showing the details of for many of the proofs, I plan to focus on the physical motivation, the statement of the results, and the heuristic principles governing the proofs.

    This is joint work with Pavel Bleher and Mikhail Lyuibich.

Monday, 6 April 2009
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3-5 pm
Room 617, Wachman Building
Department of Mathematics