NYU | COURANT

Spring 2016 Lecture Series

Clément Hongler

EPFL

The second half of the 20th century saw the convergence of Statistical Mechanics and Quantum Field Theory. In two dimensions, this convergence resulted in the most beautiful chapters of mathematical physics: Conformal Field Theory (CFT) reveals deep structures that allow for extremely precise investigations, yielding in particular non-perturbative descriptions with exact formulae.

This series will explain how 2D CFT works, in particular how planar lattice models can be understood using the Minimal Models of CFT. While this connection remains largely conjectural, major recent progress in the field of rigorous conformal invariance allows one to make mathematical sense of much of the story: In particular, for the Ising model we are close to reaching a complete understanding of how it works. The series will thus focus on giving an intuitive understanding of the global picture (in a probabilistic language) together with concrete examples, precise definitions and rigorous statements whenever they are available.

April 21, 2-3:15pm: Room 102	General picture: local fields, correlations, partition functions. Examples of models and of exact results coming from CFT.
April 29, 4-6pm: Room 1302	Fields and geometry: the stress-energy tensor, conformal symmetry, central charge, Virasoro commutation relations, unitarity, boundaries.
May 6, 4-6pm: Room 1302	Virasoro algebra representation theory: Kac determinant formula, classification of Virasoro representations, null-field equations, differential equations.
May 12, 2-4pm: Room 101	Minimal models: unitary series, fusion rules, partition functions, explicit constructions.
May 18, 4-6pm: Room 101	Beyond conformal invariance: massive theories, counting arguments, exact scattering matrices.

251 Mercer St
New York, NY 10012
www.cims.nyu.edu