Speaker: Prof. Jesper Jacobsen, Ecole Normale Superieure Paris

Title: Currents in the O(n) model

Abstract:

Using methods from the conformal bootstrap, we study the properties of Noether currents in the critical $O(n)$ loop model. We confirm that they do not give rise to a Kac-Moody algebra (for $n \neq 2$), a result expected from the underlying lack of unitarity. By studying four-point functions in detail, we fully determine the current-current OPEs, and thus obtain several structure constants with physical meaning. We find in particular that the terms $:J\bar{J}:$ in the identity and adjoint channels vanish exactly, invalidating an argument made by Cardy in 1993 that adding orientation-dependent interactions to the model should lead to continuously varying exponents in self-avoiding walks. We also determine the residue of the identity channel in the JJ two-point function, finding that it coincides both with the result of a transfer-matrix computation for an orientation-dependent correlation function in the lattice model, and with an earlier Coulomb gas computation of Cardy. This is, to our knowledge, one of the first instances where the Coulomb gas formalism and the bootstrap can be successfully compared.
(Work done in collaboration with Rongvoram Nivesvivat and Hubert Saleur.)