Quantum integrable systems, conformal field theories and stochastic processes



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Aspects of conformal field theory from random loops

In this talk I will explain how basic elements of two-dimensional conformal field theory (CFT) arise naturally in models of random loops whose probability distribution has invariance under conformal transformations - conformal loop ensembles (CLE). The principal ingredient in CFT is the stress-energy tensor. It satisfies some very constraining equations as a consequence of field-theoretic arguments: it is analytic as a function of its position, and it generates the conformal Ward identities. I will explain how these equations arise from CLE, without the need for field theory. Nontrivial Virasoro-algebraic arguments in field theory further give rise to null-vector equations. I will explain how these can also be argued for in simple terms within CLE.

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