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Exact loop densities in the O(1) dense loop model on an infinite cylinder of odd circumference.

Loop models are a class of two-dimensional statistical lattice models, and many classical models are equivalent to them. In this talk, we discuss the O(1) dense loop model on a square lattice wrapped on an infinite cylinder of odd circumference. Our main goal is to measure the average density of loops. We show that this problem is equivalent to finding the average density of percolation clusters in a percolation model with the critical probability p = 1/2 on an infinite cylinder. To find the average density of loops, we explore the relationship between the O(1) dense loop model and the six-vertex model at specific values of parameters. We apply the algebraic Bethe ansatz to diagonalize the six-vertex transfer matrix and, as a result, to calculate the average density of loops in O(1) DLM. These results reproduce the infinite-plane density limit and provide finite-size corrections predicted to be universal by the Coulomb gas theory. The talk is based on ongoing research with Alexander Povolotsky.

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