

The Gaussian free field and Pfaffian processes

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The Gaussian free field is a random field that is associated with many random surface models. The goal of this talk is to explain how they arise from Pfaffian point processes.

I will introduce a measure on plane partitions that is a Pfaffian point process. I will show that the height fluctuations around the limit shape converge to a pullback of the Gaussian process whose covariance is given by the Green's function for the Laplacian with Dirichlet boundary conditions on the first quadrant.

The result was obtained using the steepest descent analysis and by computing moments at multiple points, based on an idea of Kenyon. The argument can be generalized to a class of Pfaffian processes whose kernels possess certain properties.