The thinned extremal process of the 2D discrete Gaussian Free Field.

Oren Louidor

We consider the discrete Gaussian Free Field in a square box of side N in Z^2 with zero boundary conditions and study the joint law of its extreme values (h) and their spatial positions (x), properly centered and scaled. Restricting attention to extreme values which are also local maxima in a neighborhood of radius r_N, we show that when N, r_N \to \infty with r_N/N \to 0, the joint law above converges weakly to a Poisson Point Process with intensity measure Z(dx) e^{-\alpha h} dh, where \alpha = \sqrt{2\pi} and Z(dx) is a random measure on $[0,1]^2$. In particular, this yields an integral representation for the law of the absolute maximum, similar to that found in the context of Branching Brownian Motion. Time permitting, I will discuss various properties of the Z measure, including connections with the derivative martingale associated with the continuum Gaussian Free Field. Joint work with Marek Biskup (UCLA).