SCALING LIMITS OF $(1+1)$-DIMENSIONAL PINNING MODELS WITH LAPLACIAN INTERACTION

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We consider a random field $f : 1, ..., N \to R$ with Laplacian interaction of the form $\sum_i V(\Delta f(i))$, where Δ is the discrete Laplacian and the potential $V(\cdot)$ is symmetric and uniformly strictly convex. The pinning model is defined by giving the field a reward $\epsilon \geq 0$ each time it touches the x-axis, that plays the role of a defect line. It is known that this model exhibits a phase transition between a delocalized regime $(\epsilon < \epsilon_c)$, and a localized one $(\epsilon > \epsilon_c)$ where $0 < \epsilon_c < \infty$.

We give a a precise pathwise description of the transition, extracting the full scaling limits of the model. At the critical regime $(\epsilon = \epsilon_c)$ we show that field suitably rescaled converges in distribution towards the derivative of a symmetric Lévy process of index $2/5$.

This is a joint work with Caravenna.