Roma Tre

DIPARTIMENTO DI MATEMATICA E FISICA

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Random Walk on Dynamical Percolation: Separating Critical and Supercritical Regimes

Speaker: Yuval Peres - BIMSA Beijing

Time: Wednesday May 27, 13:00-14:00

Location: Room M3, Largo S. Murialdo 1 (Roma)

In Dynamical Percolation each edge is open with probability p, refreshing its status at rate $\mu > 0$. This process was introduced in the 1990s by Haggstrom, Steif and the speaker, motivated by a question of Malliavin. Remarkable results on exceptional times in two dimensions were obtained by Schramm, Steif, Garban and Pete.

We study random walk on dynamical percolation in the lattice $\mathbb{Z}^d$, where the walk moves along open edges at rate 1. Let $p_c = p_c(d)$ denote the critical value for static percolation. For $p < p_c$ and $\mu < 1$, joint work with Stauffer and Steiff (PTRF, 2015) showed the mean squared displacement is of order $t\mu$. For $p > p_c$, we prove that the mean squared displacement is of order t, uniformly in $0 < \mu < 1$, refining results obtained with Sousi and Steif (PTRF, 2020). In the critical regime $p = p_c$, we prove that if $d = 2$ or $d > 10$, then the mean squared displacement is at most $O(t\mu^a)$ where $a = a(d) > 0$. We will show simulations to illustrate the process.

(Joint work with Chenlin Gu, Jianping Jiang, Zhan Shi, Hao Wu and Fan Yang.)