

Phase transition for the speed of the biased random walk on a percolation cluster

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I will present my work with Alan Hammond on the sharpness of the phase transition for the speed of a biased random walk on the supercritical percolation cluster on \mathbb{Z}^d . We show that, for each $d \geq 2$, and for any supercritical parameter $p > p_c$, there exists a critical bias, such that, below this value, the speed is positive, and, above the value, it is zero. We identify the value of the critical bias explicitly, and, in the sub-ballistic regime, we find the polynomial order of the distance moved by the particle. Each of these conclusions is obtained by investigating the geometry of the traps that are most effective at delaying the walk.