

Teixeira, Augusto

On the size of a finite vacant cluster of random interacements with small intensity. (English)

Zbl 1231.60117

Probab. Theory Relat. Fields 150, No. 3-4, 529-574 (2011).

The paper deals with some properties of percolation for the vacant set of random interacements on \mathbb{Z}^d for d greater than or equal to 5 and small intensity u . The main result of the paper is a theorem, which proves a stretched exponential bound on the probability that the interlacement-set separates two macroscopic connected sets in a large cube. By applying this theorem, the author estimates the distribution of the diameter and the volume of the vacant component at level u containing the origin, given that it is finite. As another application, the author shows that with high probability, the unique infinite connected component of the vacant set is “ubiquitous” in large neighbourhoods of the origin.

Reviewer: [Anatoliy Pogorui \(Zhytomyr\)](#)

MSC:

- 60K35** Interacting random processes; statistical mechanics type models; percolation theory
- 82C41** Dynamics of random walks, random surfaces, lattice animals, etc. in time-dependent statistical mechanics

Cited in **1** Review
Cited in **14** Documents

Keywords:

[percolation](#); [finite vacant cluster](#); [model of random interacements](#)

Full Text: [DOI](#) [arXiv](#)

References:

- [1] Benjamini I., Sznitman A.S.: Giant component and vacant set for random walk on a discrete torus. *J. Eur. Math. Soc.* 10(1), 1–40 (2008) · [Zbl 1141.60057](#)
- [2] Dembo A., Sznitman A.S.: On the disconnection of a discrete cylinder by a random walk. *Probab. Theory Relat. Fields* 136(2), 321–340 (2006) · [Zbl 1105.60029](#) · [doi:10.1007/s00440-005-0485-9](#)
- [3] Dembo A., Sznitman A.S.: A lower bound on the disconnection time of a discrete cylinder. *Progress in Probability*, vol. 60. In and Out of Equilibrium 2, pp. 211–227. Birkhäuser, Basel (2008) · [Zbl 1173.82360](#)
- [4] Deuschel J.-D., Pisztora A.: Surface order large deviations for high-density. *Probab. Theory Relat. Fields* 104, 467–482 (1996) · [Zbl 0842.60023](#) · [doi:10.1007/BF01198162](#)
- [5] Erdős P., Taylor S.J.: Some intersection properties of random walk paths. *Acta Math. Acad. Sci. Hungar.* 11, 231–248 (1960) · [Zbl 0096.33302](#) · [doi:10.1007/BF02020942](#)
- [6] Grigoryan A., Telcs A.: Sub-Gaussian estimates of heat kernels on infinite graphs. *Duke Math. J.* 109(3), 451–510 (2001) · [Zbl 1010.35016](#) · [doi:10.1215/S0012-7094-01-10932-0](#)
- [7] Grimmett G.: *Percolation*, 2nd edn. Springer, New York (1999)
- [8] Kesten, H.: Aspects of first passage percolation, Ecole d’été de probabilité de Saint-Flour XIV-1984, pp. 125–264. *Lecture Notes in Mathematics*, vol. 1180. Springer, New York (1986)
- [9] Lawler G.F.: *Intersections of Random Walks*. Birkhäuser, Basel (1991) · [Zbl 1228.60004](#)
- [10] Lawler G.F.: Cut times for simple random walk. *Elect. J. Probab.* 1, 1–24 (1996) · [Zbl 0888.60059](#)
- [11] McDiarmid, C.: Concentration. *Probabilistic methods for algorithmic discrete mathematics*, pp. 195–248, *Algorithms Combin.*, 16. Springer, Berlin (1998) · [Zbl 0927.60027](#)
- [12] Resnick S.I.: *Extreme Values, Regular Variation and Point Processes*. Springer, Berlin (1987) · [Zbl 0633.60001](#)
- [13] Sidoravicius V., Sznitman A.S.: Percolation for the vacant set of random interacements. *Comm. Pure Appl. Math.* 62(6), 831–858 (2009) · [Zbl 1168.60036](#) · [doi:10.1002/cpa.20267](#)
- [14] Sznitman, A.S.: Vacant set of random interacements and percolation. *Ann. Math.*, arXiv:0704.2560 (2010, to appear) · [Zbl 1202.60160](#)
- [15] Sznitman A.S.: Random walks on discrete cylinders and random interacements. *Probab. Theory Relat. Fields* 145, 143–174 (2009) · [Zbl 1172.60316](#) · [doi:10.1007/s00440-008-0164-8](#)

- [16] Sznitman A.S.: Upper bound on the disconnection time of discrete cylinders and random interlacements. *Ann. Probab.* 37(5), 1715–1746 (2009) · [Zbl 1179.60025](#) · [doi:10.1214/09-AOP450](#)
- [17] Sznitman A.S.: On the domination of random walk on a discrete cylinder by random interlacements. *Elect. J. Probab.* 14, 1670–1704 (2009) · [Zbl 1196.60170](#)
- [18] Teixeira A.Q.: On the uniqueness of the infinite cluster of the vacant set of random interlacements. *Ann. Appl. Probab.* 19(1), 454–466 (2009) · [Zbl 1158.60046](#) · [doi:10.1214/08-AAP547](#)
- [19] Windisch D.: On the disconnection of a discrete cylinder by a biased random walk. *Ann. Appl. Probab.* 18(4), 1441–1490 (2008) · [Zbl 1148.60028](#) · [doi:10.1214/07-AAP491](#)
- [20] Windisch D.: Random walk on a discrete torus and random interlacements. *Elect. Commun. Probab.* 13, 140–150 (2008) · [Zbl 1187.60089](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.