Zero-range process in random environment

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We consider a zero-range process with site disorder. This one-dimensional, nearest-neighbor, attractive dynamics with a bounded jump rate, exhibits a phase transition: there are no invariant measures above some critical density. In collaboration with C. Bahadoran, T. Mountford and K. Ravishankar (see [2, 3, 4, 5] and also [1]), we have first obtained necessary and sufficient conditions for weak convergence to the critical invariant measure. We have then derived the hydrodynamical behavior of the system, and finally, we have proven local equilibrium results, and a dynamical loss of mass.

References

[1] Bahadoran, C.; Guiol, H.; Ravishankar, K.; Saada, E., *Euler hydrodynamics for one-dimensional attractive particle systems*, To appear in: *Sojourns in Probability and Statistical Physics, Ed. Vladas Sidoravicius*, Springer (2019). Arxiv 1701.07994

[2] Bahadoran, C.; Mountford, T.S.; Ravishankar, K.; Saada, E., *Supercriticality conditions for asymmetric zero-range process with sitewise disorder*, Braz. J. Probab. Stat. (2015).

[3] Bahadoran, C.; Mountford, T.S.; Ravishankar, K.; Saada, E., *Supercritical behavior of asymmetric zero-range process with sitewise disorder*, Ann. Inst. H. Poincaré Probab. Statist. (2017).

[4] Bahadoran, C.; Mountford, T.S.; Ravishankar, K.; Saada, E., *Hydrodynamics in a condensation regime: the disordered asymmetric zero-range process*, To appear in: Ann. Probab. (2019). arXiv:1801.01654

[5] Bahadoran, C.; Mountford, T.S.; Ravishankar, K.; Saada, E., *Quenched convergence and strong local equilibrium for asymmetric zero-range process with sitewise disorder*, On line first in: Probab. Theory Rel. Fields (2019).