SCALING LIMIT FOR THE CONDENSATE DYNAMICS IN A REVERSIBLE ZERO-RANGE PROCESS

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Zero range processes with decreasing jump rates can equilibrate in a condensed phase when the particle density exceeds a critical value $\rho_c$. In this phase a non-trivial fraction of the mass in the system concentrates on a single site, the condensate. At suitably long time scales, the location of this site changes. Beltrán and Landim [1] have studied the motion of the condensate for zero-range processes on finite sets and have shown that – observed at the right time scale – it converges to a random walk on this set. In this work we consider a supercritical nearest neighbor symmetric zero-range process with $N$ particles on the discrete torus $\mathbb{Z}/L\mathbb{Z}$, in the thermodynamic limit, i.e. $L, N \to \infty$, $N/L \to \rho > \rho_c$. We use a coupling argument to obtain lower bounds for the jump rate of the condensate, mixing time estimates and potential-theoretic tools to show [2] that the scaling limit of the condensate dynamics is a Lévy process on the unit circle with jump rates inversely proportional to the jump length.

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References

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1Joint work with Inés Armendáriz and Stefan Grosskinsky.