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Interacting Particle Systems, on finite or infinite lattices, conservative (SEP, ZRP, in random environment) or non-conservative (contact process and variations, sandpile dynamics), in equilibrium (invariant measures, limit theorems) or out of equilibrium (hydrodynamic limits)

Collaborators : E. Andjel, G. Amir, C. Bahadoran, O. Benois, J. Bérard, O. Busani, P. Calka, A. de Masi, L. Fajfrovà, M. Falconnet, P. Ferrari, N. Gantert, T. Gobron, H. Guiol, A. Járai, C. Kipnis, K. Kuoch, C. Maes, T. Mountford, M. Mourragui, E. Orlandi, E. Presutti, K. Ravishankar, F. Redig, R. Roy, W. Ruszel, A. Sarkar, F. Sau, R. Schinazi, L. Triolo.

SEP and variations : invariant measures ?

...Bernoulli product measures ...what else ?

• For SEP on $\mathbb{Z}$ with irreducible $p(y - x)$, an important open problem : do nonblocking stationary profile measures exist ? i.e. μ on $\{0, 1\}^{\mathbb{Z}}$ that does not concentrate on configurations η s.t. $\sum_{x<0} \eta(x) + \sum_{x>0}[1 - \eta(x)] < +\infty$ and with $\lim_{x \to -\infty} \mu\{\eta : \eta(x) = 1\} = 0$ and $\lim_{x \to +\infty} \mu\{\eta : \eta(x) = 1\} = 1$.

• and beyond $\mathbb{Z}$?

Two-lane SEP (joint work with G. Amir, C. Bahadoran, O. Busani : http://arxiv.org/abs/2105.12974
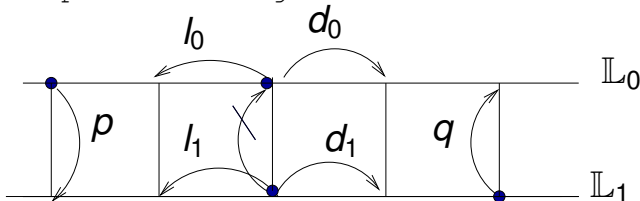
analogous to Bernoulli, blocking and partial blocking measures, but many questions left.