

# Inn'formal Probability Seminar

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**“Branching annihilating random walk”**

## **Abstract**

We study a branching annihilating random walk (BARW) in which particles move on the discrete lattice in discrete generations. Each particle produces a poissonian number of offspring which independently move to a uniformly chosen site within a fixed distance from their parent's position. Whenever a site is occupied by at least two particles, all the particles at that site are annihilated. This can be thought of as a very strong form of local competition and implies that the system is not monotone. For certain ranges of the parameters of the model we show that the system dies out almost surely or, on the other hand, survives with positive probability. In an even more restricted parameter range we strengthen the survival results to complete convergence with a non-trivial invariant measure. A central tool in the proof is comparison with oriented percolation on a coarse-grained level, using carefully tuned density profiles which expand in time and are reminiscent of discrete travelling wave solutions. Based on a joint work with Matthias Birkner (JGU Mainz), Jiří Černý (University of Basel), Nina Gantert (TU Munich) and Pascal Oswald (University of Basel).

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