

Abstract Submitted
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Will jams get worse when slow cars move over? B. SCHMITTMANN, J. KROMETIS, R.K.P. ZIA, Virginia Tech — Motivated by an analogy with traffic, we simulate two species of particles (‘vehicles’), moving stochastically in opposite directions on a two-lane road. In this simple modification of the asymmetric exclusion process, each species prefers one lane over the other, controlled by a parameter $0 \leq b \leq 1$ such that $b = 0$ corresponds to random lane choice and $b = 1$ to perfect ‘laning’. We find that the system displays one large cluster (‘jam’) whose size increases with b , contrary to intuition. Even more remarkably, the lane ‘charge’ (a measure for the number of particles in their preferred lane) exhibits a region of negative response: even though vehicles experience a stronger preference for the ‘right’ lane, more of them find themselves in the ‘wrong’ one! For b very close to 1, a sharp transition restores a homogeneous state. Various characteristics of the system are computed analytically, in good agreement with simulation data.

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