

Spurious Phase in a Model for Traffic on a Bridge

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Researchers at Virginia Tech are providing further insight into the physics of systems far from equilibrium by studying traffic patterns across a narrow bridge.

Physicists at Virginia Tech are investigating two-species driven diffusive systems, and relating their work to the study of traffic on a narrow bridge. This research is reported in the *Journal of Physics A: Mathematical and General* (www.iop.org/EJ/journal/JPhysA) published by Institute of Physics Publishing.

David W. Erickson, Gunnar Pruessner, B Schmittmann and R K P Zia present high-precision Monte Carlo data for the phase diagram of a two-species driven diffusive system, reminiscent of traffic across a bridge.

They assume that traffic across a long and narrow bridge will flow freely on clear stretches, but slow down for oncoming cars. If all drivers exhibit similar driving styles, then the numbers of cars traveling in each of the two directions should be roughly equal. However, under certain circumstances, this symmetry can be “spontaneously broken,” i.e., there may be many more cars traveling in one direction than the other.

These surprises were discovered in large scale simulations of a simple model. In particular, their research clarifies how the length of the “bridge” plays a crucial role in this model.

Source: Institute of Physics Publishing

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