

The Jammed Phase of the Biham-Middleton-Levine Traffic Model

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Abstract

Initially a car is placed with probability p at each site of the two-dimensional integer lattice. Each car is equally likely to be East-facing or North-facing, and different sites receive independent assignments. At odd time steps, each North-facing car moves one unit North if there is a vacant site for it to move into. At even time steps, East-facing cars move East in the same way. We prove that when p is sufficiently close to 1 traffic is jammed, in the sense that no car moves infinitely many times. The result extends to several variant settings, including a model with cars moving at random times, and higher dimensions.

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Pages: 167-178

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