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A criterion for condensation in kinetically constrained one-dimensional transport models DANIEL MIEDEMA, University of Amsterdam — In transport, increasing the number of transporting particles not necessarily results in an increase of the throughput. When the density of a complex system increases, the current can decrease rapidly due to jamming effects. Jammed particles can form many clusters or one big cluster: a condensate in real space. We study condensation in one-dimensional transport models with a kinetic constraint. We find the conditions under which the arrested clusters can grow to a macroscopic condensate of arrested particles. We apply our finding to the well-known Nagel-Schreckenberg traffic flow model to analytically proof the existence of a condensate in a deterministic limit of this model, and verify this result with simulations. These results provide insight into dynamic arrest and dynamic phase separation in one-dimensional traffic and transport.

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