Random organization: A dynamical phase transition LAURENT
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NYU — We introduce a simple model motivated by recent experiments in sheared
suspensions. We show that completely random displacements of colliding particles
are sufficient to generate an organized state where further collisions are suppressed.
This organization by self-activated random walkers presents a much more efficient
process than when all particles are diffusing. It only occurs provided that the density
in particle is lower than a critical value ρ_c and is characterized by a dynamical
phase transition. A mean-field description captures the existence of this transition.
It suggests that the value of ρ_c is determined by the ratio p_s/p_c, where p_s is the
probability for a pair of colliding particles to separate and p_c is the probability
that a "quiet" particle be collided. Our results also reveal that the ordering can
be enhanced by straining the system periodically. However, these more organized
states become less and less accessible as the strain amplitude is increased.

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