

## Collective effects induced by diversity

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### Abstract

We show that diversity, in the form of quenched noise, can have a constructive effect in the dynamics of extended systems. We first consider a bistable  $\phi$ -4 model composed by many coupled units and show that the global response to an external periodic forcing is enhanced under the presence of the right amount of diversity (measured as the dispersion in one of the parameters defining the model). As a second example, we consider a system of active-rotators and show that while they are at rest in the homogeneous case, the disorder introduced by the diversity suffices to trigger the appearance of common firings or pulses. Both effects require very simple ingredients and we expect the results presented here to be of interest in similar models of interest in the biological and social sciences.