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Satisfying Detailed Balance in Mesoscale Lattice Models of Amorphous Plastic Deformation MICHAEL FALK, Johns Hopkins Univ — A number of lattice and finite element models have been proposed to model the correlations and localization transitions that occur during driven plastic flow in glasses and granular media. Green's function formulations are used to redistribute stress from local shear transformation events. However the ad hoc kinetic assumptions used in such models often lead to violations of detailed balance. These violations preclude the association of a given configuration of the model with a well-defined energy. In this way these models are very different from atomistic models of deformation, where energy is explicitly defined and forces are derived from the underlying energy description. Here we discuss the origin of these violations of detailed balance, and discuss how mesoscale lattice models of shear transformation activity that satisfy detailed balance can, in principle, be constructed.

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