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The Complementary Roles of Noise and Energy in Deformation ROBB THOMSON, Retired, MARISOL KOSLOWSKI, RICHARD LESAR, Los Alamos Natl. Lab — It is generally recognized that noise–the internal stress fluctuations on a typical mobile dislocation– is important in determining the final partially ordered state in a deformed sample. Current theories view the deformed state as a noise induced transition. But energy must play an equally important role in the determination of that ordered state, and we will present ideas to the effect that noise and energy actually play opposing roles. That is, just as in a thermodynamic phase transition, the final state is determined by a balance between the countervailing tendencies of energy minimization and the noise fluctuations. We will show that a function can be defined for this highly nonequilibrium case that has similarities to thermodynamic free energy, and that this psuedo free energy is minimized in the final state.

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