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**Fluctuation theorem in dynamical systems with quenched disorder** JEFFREY DROCCO, Princeton University, CYNTHIA OLSON REICHHARDT, CHARLES REICHHARDT, Los Alamos National Laboratory — We demonstrate that the fluctuation theorem of Gallavotti and Cohen can be used to characterize far from equilibrium dynamical nonthermal systems in the presence of quenched disorder where strong fluctuations or crackling noise occur. By observing the frequency of entropy-destroying trajectories, we show that the theorem holds in specific dynamical regimes near the threshold for motion, indicating that these systems might be ideal candidates for understanding what types of nonthermal fluctuations could be used in constructing generalized fluctuation theorems. We also discuss how the theorem could be tested with global or local probes in systems such as superconducting vortices, magnetic domain walls, stripe phases, Coulomb glasses and earthquake models.

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