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**Power law avalanche distributions in quasistatic shear of disordered systems with inertia** KENNETH SALERNO, MARK ROBBINS, Johns Hopkins University, CRAIG MALONEY, Carnegie Mellon University — Crackling noise, or avalanche behavior can occur in a wide variety of systems. These avalanches are often characterized by scale-free, power law behavior. Our molecular dynamics simulations subject an amorphous bidisperse solid with Lennard-Jones or repulsive harmonic interactions to quasistatic shear. A variety of two and three dimensional geometries with periodic or confined boundary conditions under pure or simple shear are considered. Deformation occurs through a series of avalanches of plastic activity whose energy, duration and physical size are determined. Similar power law distributions of avalanche energies are found for all geometries as long as the particle dynamics is underdamped. Results for different system sizes can be collapsed using finite-size scaling. This power law scaling is eliminated when particle motion is overdamped, and the probability decays exponentially with energy.

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