

Exploring Amorphous Carbon Avalanches with Numerical Continuation

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In glasses, plasticity occurs through rearrangements of localized regions that flip discretely between states, so called 'shear transformations'. In amorphous carbon specifically, shear transformations are the breaking or forming of single bonds between atoms, with much of the deformation manifesting as 'avalanches' where multiple of these single-bond events happen simultaneously in a single simulation timestep. Via the application of a numerical continuation method, I will show that avalanche events, previously considered inseparable cascades, can be split into constituent smaller hops between basins, each with its own energy barrier. The insight this offers into the structure of these crucial processes has the potential to significantly contribute to the mechanistic understanding of plasticity in amorphous materials.