

Abstract Submitted
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Softness Correlations Across Length Scales¹ ROBERT IVANCIC, University Of Pennsylvania, AMIT SHAVIT, Thomson Reuters, JENNIFER RIESER, SAMUEL SCHOENHOLZ, University Of Pennsylvania, EKIN CUBUK, Harvard, DOUGLAS DURIAN, ANDREA LIU, ROBERT RIGGLEMAN, University Of Pennsylvania — In disordered systems, it is believed that mechanical failure begins with localized particle rearrangements. Recently, a machine learning method has been introduced to identify how likely a particle is to rearrange given its local structural environment, quantified by *softness*. We calculate the softness of particles in simulations of atomic Lennard-Jones mixtures, molecular Lennard-Jones oligomers, colloidal systems and granular systems. In each case, we find that the length scale characterizing spatial correlations of softness is approximately a particle diameter. These results provide a rationale for why localized rearrangements—whose size is presumably set by the scale of softness correlations—might occur in disordered systems across many length scales.

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