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**Investigating strain softening and hardening in soft amorphous solids** MEHDI BOUZID, EMANUELA DEL GADO, Georgetown University, Department of Physics — Disordered elastic solids of soft condensed matter like proteins, colloids or polymers are ubiquitous in nature and important for modern technologies. They belong to the class of amorphous systems and can form even at very low solid volume fraction via aggregation into a variety of complex and often poorly connected networks.The ability to explain and tune their mechanical properties in terms of their microscopic structure remains a challenge. We use molecular dynamics simulations of a model system to investigate the emergence of the non-linear behavior. Under shear deformations the system exhibits strong localization of tensile stresses that may be released through the breaking of bonds. We show how the interplay between structural connectivity and local internal stresses controls the mechanical response, leading to a strain softening and/or hardening. Our findings help rationalize various experimental findings.

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