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Creep and aging in jammed granular materials ISHAN SRIVASTAVA, TIMOTHY FISHER, Purdue Univ — Granular materials flow (or unjam) when stressed above the Coulomb yield stress, but a slow creep is observed when the applied stresses are low. In this work, using a recently introduced enthalpy-based variable-cell simulation method, we will present results on the creep and slow aging dynamics in granular systems comprised of soft particles of varying shape that are hydrostatically jammed and subjected to an external stress. We observe a two-stage creep with an initial fast exponential evolution followed by a slow logarithmic evolution over long time scales. We correlate the slow creeping dynamics with micromechanical evolution at the grain scale, such as increasing dynamical heterogeneity and force-chain rearrangements. Results will also be presented on the effect of grain shape (faceted vs. spherical) on the creep and aging dynamics. Finally, a continuum granular fluidity model is developed to rationalize these observations.

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