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Plastic deformation of a model glass induced by a local shear transformation NIKOLAI PRIEZJEV, Wright State University — The effect of a local shear transformation on plastic deformation of a three-dimensional amorphous solid is studied using molecular dynamics simulations. We consider a spherical inclusion, which is gradually transformed into an ellipsoid of the same volume and then converted back into the sphere. It is shown that at sufficiently large strain amplitudes, the deformation of the material involves localized plastic events that were identified based on the relative displacement of atoms before and after the shear transformation. We found that the density profiles of cage jumps decay away from the inclusion, which correlates well with the radial dependence of the local deformation of the material. At the same strain amplitude, the plastic deformation becomes more pronounced in the cases of weakly damped dynamics or large time scales of the shear transformation. We showed that the density profiles can be characterized by the universal function of the radial distance multiplied by a dimensionless factor that depends on the friction coefficient and the time scale of the shear event.

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