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**Wrinkling vs. scarring: Stress collapse in surface-confined assemblies** GREGORY GRASON, University of Massachusetts Amherst — Confining assemblies to surfaces possessing Gaussian curvature frustrates the microscopic order of the packing, thus introducing mechanical costs for assemblies in such diverse contexts as viral capsids and particle-coated drops. The structure and stability of these systems is complicated by the non-trivial competition between distinct modes of stress relaxation, including "elastic" shape deformation of the surface-bound assembly; defect-mediated "plastic" reorganization of packing. We consider the interplay between these shape-deformation and defect-relaxation for a model of crystalline patch bound to an adhesive and deformable sphere, where the distinct patterns of relaxation become, respectively, radial chains of dislocations, or "scars", and radial wrinkles. Analysis of highly-wrinkled and defect-riddle states reveals remarkably that both modes achieve the *identical* mechanical state in the limits of vanishing thickness and lattice spacing, and further, that the degeneracy between these modes is lifted only by the microscopic and sub-dominant energetics that select their optimal symmetry. We present a structural relaxation phase diagram that predicts a wrinkle-to-scar transition driven both by increasing substrate stiffness and substrate curvature.

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