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Imaging Forces on Stressed Spheres NICOLAS BRODU, JOSHUA DIJKSMAN, Duke University, HU ZHENG, Tongji University, ROBERT BEHRINGER, Duke University — We study the quasi-static deformation of three dimensional sphere packings over a range of compressive stresses. We perform experiments on slightly polydisperse, nearly frictionless soft hydrogel spheres in a modified tri-axial shear apparatus. We measure boundary stresses and access microstructural information by 3D imaging the entire packing. By resolving particle deformations via custom written image analysis software, we extract particle contacts and forces. We address whether sheared frictionless spheres display dilatancy pressure, we measure the non-linear force response of a disordered packing under compression and explore the plastic rearrangements inside cyclically sheared and compressed packings.

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