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Compression and shear in ultra low friction soft sphere packings: an experimental exploration[1] HU ZHENG, Tongji University, JOSHUA DIJKSMAN, ROBERT BEHRINGER, Duke University — We study the quasi-static deformation of three dimensional sphere packings close to the onset of mechanical rigidity. We perform the experiments on slightly polydisperse, nearly frictionless soft hydrogel spheres in a tri-axial shear apparatus. We can access both system pressure and structural flow information by index matched scanning on the submersed, transparent hydrogel spheres. 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 com pressed packings.

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Hu Zheng
Tongji University

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