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Long-wavelength density fluctuations in random close packing REI KURITA, ERIC WEEKS, Emory University — Long-wavelength density fluctuations in dense amorphous systems are both of scientific interest and also industrial relevance. These fluctuations relate to shear instabilities and the cracking of glassy materials. Some simulations investigated the random close packing of monodisperse hard spheres and suggested that there are few long-wavelength density fluctuations and thus the system is hyper-uniform. To check this suggestion, we study the random packing of colloidal particles using confocal microscopy. We take very large images (0.5 mm * 0.5 mm * 0.03 mm) at high resolution (less than 0.5 microns) by connecting overlapping microscope images of small regions, allowing us to investigate the density at large length scales. We find that the system is not hyper-uniform and long density fluctuations exist.

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