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Soft particle packings near jamming: correlations in static structure KAMRAN KARIMI, CRAIG MALONEY, Carnegie Mellon University — We extend our previous results report on 2D simulations of soft harmonic packings at various area fractions φ above the jamming point φ_c. We employ several statistical analyses to determine whether one or more characteristic lengths can be associated with either the quenched stress field in the packing or the structure of local elastic moduli. First, we define a locally anisotropic variant of the standard two-point correlation function. This anisotropic correlation function follows a power law even in globally isotropic stress states with a φ independent exponent and no discernible cutoff within the statistically accessible regime. Secondly, we define a coarse-grained stress field on a scale R. The average anisotropic component and the fluctuations in the trace can both be collapsed onto similar master curves after rescaling R by a characteristic length scale ξ. ξ accelerates as φ approaches φ_c, consistent with a divergence at φ_c. Surprisingly, a similar analysis on the local coarse-grained elastic modulus tensor shows a non-trivial power-law scaling behavior as a function of the coarse-graining size yet no characteristic ξ as exhibited by the stress.

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