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Rate and age-dependence of shear yield stress in loose sphere packings[1] GREG FARRELL, NARAYANAN MENON, University of Massachusetts Amherst — Frictional packings of hard spheres can be stable in loose volume fractions well below random close packing. We study the stability of these solids to shear perturbations in the little-studied regime close to the random loose packing limit [1]. We present experimental data on the shear yield stress as a function of rate and age in sedimented loose packings of frictional, non-cohesive, PMMA spheres. The yield stress is found to depend on both the rate of strain and age of the packing since last breakage, both to approximately the positive one-third power. The regime of elastic response at finite strain-rate is insensitive to the viscosity of the interstitial fluid. With this common choice of materials and preparation conditions, no rate-independent elastic regime was seen, even at the smallest strains experimentally achieved. [1] Farrell GR, Martini KM, and Menon N, *Soft Matter*, **6**, 2925 (2010).

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Greg Farrell
University of Massachusetts Amherst

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