

Abstract Submitted
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Model-free test for nonlocal effects in jammed matter¹ BRIAN TIGHE, KARSTEN BAUMGARTEN, TU Delft — There is growing evidence that the mechanical response of materials close to the jamming transition is nonlocal, i.e. the deformation (rate) at one position is influenced by stresses at a distance. Nonlocal models successfully describe flow in a number of geometries where conventional local models fail not just quantitatively but qualitatively. Research to date has advanced by proposing a nonlocal model, which generally contains free parameters, and fitting its predictions to experimental or numerical data. This makes it difficult to distinguish the general effects of nonlocality from the details of a particular model. We take a different approach by introducing a model-free test for nonlocality. The test is easily implemented in computer simulations and provides a quantitative measure of the amplitude of nonlocal effects, without assuming a model for the nonlocal mechanics of the material. We demonstrate this method in several model systems, including soft spheres near jamming.

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