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Micro-mechanical lengthscales in soft elastic solids EDAN LERNER, ERIC DEGIULI, New York University, Center for Soft Matter Research, 4 Washington Place, New York, NY, 10003, USA, GUSTAVO DÜRING, Facultad de Física, Pontificia Universidad Católica de Chile, Casilla 306, Santiago 22, Chile, MATTHIEU WYART, New York University, Center for Soft Matter Research, 4 Washington Place, New York, NY, 10003, USA — We provide numerical evidence and supporting scaling arguments that the response of soft elastic solids to a local force dipole is characterized by a lengthscale ℓ_c that diverges as unjamming is approached as $\ell_c \sim (z - 2d)^{-1/2}$, where $z \geq 2d$ is the mean coordination, and d is the spatial dimension, at odds with previous claims based on numerics. We also show how the magnitude of the lengthscale ℓ_c is amplified by the presence of internal stresses in the disordered solid. Our data raise the possibility of a divergence of ℓ_c with proximity to a critical internal stress at which a buckling instability takes place.

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