

Abstract Submitted
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Visualization of force networks in a three-dimensional granular system CHANTAL CARPENTIER, KINGA LORINCZ, PETER SCHALL, DANIEL BONN, FRED BROUWER, University of Amsterdam — Force networks form the skeleton of granular matter. The understanding of the rigidity to flow transition of granular materials requires the study of the three-dimensional distribution of forces between the particles. Here we propose a new method to visualize and measure contact forces in three-dimensional suspensions. We use a rigidochromic dye which we attach chemically to the surfaces of the particles to measure local forces at the contact point. This dye exhibits non-fluorescent transitions, when it is free to relax mechanically, but shows strong fluorescence when confinement blocks mechanical relaxation. Preliminary experiments suggest that the fluorescent intensity is a direct measure of the local contact force. We use confocal microscopy to create spatial intensity maps to reconstruct the entire contact force distribution.

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