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Controlling cohesive forces in granular media CHRISTOPH GÖGELEIN, MATTHIAS SCHRÖTER, MARTIN BRINKMANN, STEPHAN HERMINGHAUS, Max-Planck-Institut für Dynamik und Selbstorganisation, Bunsenstrasse 10, 37073 Göttingen, Germany — When adding a small amount of water to a pile of granular matter, e.g., sand heap, close-by grains can be connected by liquid bridges [1]. Thus, the material becomes plastically and can sustain a larger stress as compared to dry sand. Our general aim is to compare the mechanical properties of wet and dry granular media. For this purpose, we use a suspension of micrometer large glass or Latex spheres dispersed in a binary liquid mixture. The suspending water-lutidine(oil) mixture exhibits a lower critical solution temperature leading to a water-oil-like phase separation slightly above ambient temperature. Close to this demixing region, the oil-like phase undergoes a pre-wetting transition on the particle glass surface inducing liquid bridges [2]. Thus, by varying the temperature we can switch the liquid bridges on and off. We will report on our attempts to directly visualize the formation and control of liquid bridges using confocal and non- confocal microscopy.

[1] M. Scheel, *et al.*, Nature Materials 7, 174 (2008)

[2] D. Beysens, and D. Esteve, Phys. Rev. Lett. 54, 2123 (1985)

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