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Mechanical response of foams : elasticity, plasticity, and rearrangements

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ON WORK PRESENTED IN THIS THESIS:

- (i) Merlijn S. van Deen, Johannes Simon, Zorana Zeravcic, Simon Dagois-Bohy, Brian P. Tighe, and Martin van Hecke.
Contact Changes near jamming.
Phys. Rev. E **90**, 020202 (2014). doi:10.1103/PhysRevE.90.020202
- (ii) Merlijn S. van Deen, Brian P. Tighe, and Martin van Hecke.
Contact Changes of Sheared Systems: Scaling, Correlations, and Mechanisms. Submitted to Phys. Rev. E., arxiv:1606.04799
- (iii) Merlijn S. van Deen, Sven Wijtmans, M. Lisa Manning, and Martin van Hecke.
Rearrangements in Sheared Disordered Solids. In preparation.
- (iv) Merlijn S. van Deen, Alexander O.N. Siemens, and Martin van Hecke.
Rearrangements in Wet and Dry foams. In preparation.

ON OTHER WORK

- (v) Erik Woldhuis, Vijayakumar Chikkadi, Merlijn S. van Deen, Peter Schall and Martin van Hecke.
Fluctuations in flows near jamming,
Soft Matter **11**, 7024 (2015). doi:10.1039/c5sm01592h
- (vi) Merlijn S. van Deen, Thibault Bertrand, Nhung Vu, David Quéré, Eric Clément, and Anke Lindner.
Particles accelerate the detachment of viscous liquids,
Rheologica Acta **52**, 403 (2013). doi:10.1007/s00397-013-0691-9

PUBLISHED SOFTWARE AND DATA SETS

Authors listed in alphabetical order

- (vii) Simon Dagois-Bohy, Johannes Simon, Merlijn S. van Deen, and Zorana Zeravcic.
JamBashBulk: two-dimensional packing simulation.
Zenodo. doi:10.5281/zenodo.60972
- (viii) Merlijn S. van Deen.
Data analysis code for *JamBashBulk* packings.
Zenodo. doi:10.5281/zenodo.60687
- (ix) Simon Dagois-Bohy, Silke Henkes, Johannes Simon, Brian P. Tighe, Merlijn S. van Deen, Martin van Hecke, and Zorana Zeravcic.
Shear-stabilized jammed packings.
Zenodo. doi:10.5281/zenodo.59216
- (x) Simon Dagois-Bohy, Silke Henkes, Johannes Simon, Brian P. Tighe, Merlijn S. van Deen, Martin van Hecke, and Zorana Zeravcic.
Sheared shear-stabilized jammed packings.
Zenodo. doi:10.5281/zenodo.59217

SUPPLEMENTAL MATERIAL TO THIS THESIS

- (xi) Merlijn S. van Deen.
Mechanical Response of Foams: Elasticity, Plasticity, and Rearrangements (Supplemental material).
Zenodo. doi:10.5281/zenodo.57013
- (xii) Merlijn S. van Deen.
Mechanical Response of Foams: Elasticity, Plasticity, and Rearrangements (Data analysis notebooks).
Zenodo. doi:10.5281/zenodo.60684

CURRICULUM VITAE

I was born on November 22nd, 1988 in The Hague. I grew up in the same city, and followed my secondary education at the *Gymnasium Haganum*. In 2006, I obtained my vwo degree and started my undergraduate studies in both Physics and Astronomy at Leiden University. During that time, I spent a year organizing science shows for high schools, as board member for Stichting Rino. In 2010, after a research project in the Quantum Optics group on *Spatial Heterodyne Spectroscopy*, I obtained both BSc diplomas.

After finishing both BScs, I started on an MSc in Experimental Physics, also at Leiden University. For this degree, I worked on two research projects: *Measurements on 2D Force Networks* in the Complex Media and Metamaterials (CMM) research group at Leiden University, and *Experiments on the droplet detachment of suspensions* in the PMMH group at the ESPCI (Paris, France). I received my degree *cum laude* in 2012, and started my PhD in the CMM group shortly thereafter.

Under supervision of Prof. dr. M.L. van Hecke, I researched the mechanical response of foams, in both simulations and experiments. The results of these four years have been collected in this thesis. Part of this work was performed in close collaboration with dr. M.L. Manning and S. Wijtmans at Syracuse University (United States).

During my PhD, I was a Teaching Assistant for the undergraduate courses *Diffusion*, *Fourier Physics* and *Introduction to Python*. I attended schools in Orsay, Les Houches and Montpellier (France), Enschede (The Netherlands), and Easton, MA (United States), and presented work at conferences in Thessaloniki (Greece), Ruthin (Wales), Nantes (France), Baltimore, Denver and San Antonio (United States).

In September 2016, I started as Advisor in New Technologies at UL's Transaction Security division in Leiden.

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