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Vibrations in materials with granularity

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Stellingen

accompanying the PhD thesis

Vibrations in Materials with Granularity

1. Although Maxwell's stability criterion accurately describes jammed sphere packings, it breaks down for the case of jammed ellipsoids, for arbitrarily small ellipticity.

this thesis, chapter 2

2. Even though introduction of ellipticity to spheres produces non-trivial rotational modes, it is a benign perturbation.

this thesis, chapter 2

3. Counterintuitively, it is possible to access localization lengths that are larger than the system size.

this thesis, chapter 3

4. Exponential Anderson localization breaks down for the case of long range $1/r$ interaction. Instead one finds power law localization.

this thesis, chapter 4

5. Dimers and ellipsoids belong to the same symmetry group but do not make a solid with the same mechanical properties.

Schreck et al. (2010)

6. Random spring networks are not good models for jammed packings: their bulk moduli display different scalings.

Ellenbroek et al. (2009)

7. In packings of soft spheres the probability distribution of forces $P(f)$ is more robust than the pair correlation function $g(r)$.

Zeravcic et al. in preparation

8. Theorists should *noise-up* their simulations of granular materials in order to compare to experiments, not the other way around.

9. Measuring the fine structure constant is so easy nowadays that it should be a lab exercise for physics students!

Nair et al. (2008)

10. Even in the atmosphere of Mars one might see rainbow colors.

Cowley and Schroeder (1999)

Zorana Zeravcic
Leiden, June 29, 2010