



The “shear-gradient concentration coupling instability”: non-uniform flow of sheared hard-sphere glasses.

Jan K.G. Dhont
Forschungszentrum Juelich

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There are several types of shear-induced instabilities in soft-matter systems. The microscopic origin of some well-known instabilities will be shortly addressed. A shear-induced instability that is not yet understood is the so-called “Shear-gradient Concentration Coupling instability” (the SCC-instability). This instability relies on the existence of a shear-gradient induced mass flux together with a strong coupling of the stress to concentration. The origin of the shear-induced mass flux resulting from direct interactions is so far not understood, and explicit expressions for the corresponding transport coefficient have therefore not been derived. In this presentation, the origin of this mass flux is discussed, an explicit expression for the transport coefficient is presented, and numerical results are discussed for the stationary non-uniform flow profiles and concentration profiles of an initially SCC-unstable system, which will be compared to experiments on hard-sphere glasses.