
Flows of suspensions of particles in yield stress fluids studied by X-ray microtomography

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Abstract

Suspensions of noncolloidal spheres dispersed in yield stress fluids are good model systems for understanding the rheology of fresh concrete or debris flows, and more generally, the behavior of particles dispersed in any nonlinear material. The particle distribution in space is a key element of their behavior. At the particle level, they display anisotropies under shear, which can be characterized by pair distribution functions. At the macroscopic level, they tend to develop concentration inhomogeneities. In this talk, we will show how such information can be obtained by coupling a flow device and X-ray tomography. We will discuss briefly some new insights brought by these coupled measurements. We will also show that simple 2D X-ray imaging can be used to provide time-resolved concentration fields.

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