

Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

X-ray Mapping of Dynamic Suspensions¹ MOHAMMAD GHOLAMI, Mechanical Eng. Dept., Ohio University, 251 Stocker , Athens, OH 45701, USA., NICOLAS LENOIR, GUILLAUME OVARLEZ, PLACAMAT, UMS3626-CNRS/University of Bordeaux, Pessac, 33608, France, SARAH HORMOZI, Mechanical Eng. Dept., Ohio University, 251 Stocker, Athens, OH 45701, USA. — Dense non-colloidal suspensions are materials with broad application both in industrial processes and natural phenomena. In most of these applications, the suspensions are either far from equilibrium or strongly non-Newtonian (i.e., non-colloidal particles are suspended in non-Newtonian fluid) meaning that the flow kinetics are not only strain-dependent but also strain-rate dependent. Therefore, experimental techniques must be developed to analyze the flows of these complex suspensions over a wide range of steady and transient shear rates. Techniques such as Nuclear Magnetic Resonance/Imaging (NMR/I) are inapplicable due to low sampling frequency and low image resolution[1] (typically 10 minutes per averaged NMR image of 1x1cm). We introduce a new technique using an X-ray/CT-scan system to study dynamic suspensions. We show our recent results on the application of this technique for the study of shear induced migration of particles in a yield stress matrix fluid in a wide-gap cylindrical Couette cell. This work opens new avenues to study dynamic non-colloidal suspensions and the suspensions with other types of nonlinear suspending fluids such as viscoelastic and shear thickening fluids. [1] Ovarlez,G., et al.,Journal of Rheology, Vol 50, 2006, pp. 259-292.

¹NFS(CBET-1554044-CAREER)

Mohammad Gholami
Mechanical Eng. Dept., Ohio University, 251 Stocker , Athens, OH 45701, USA.

Date submitted: 03 Aug 2016

Electronic form version 1.4