

Granular film rheology

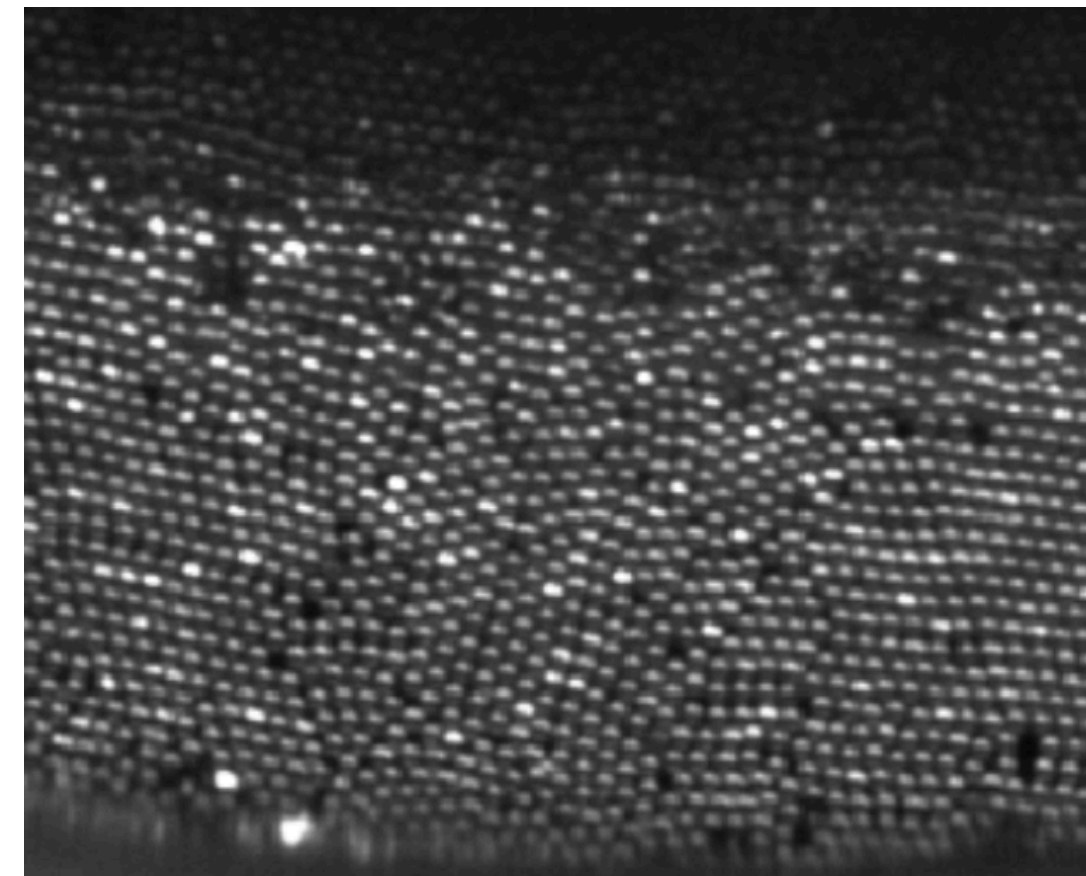
J. Lalieu, A. Seguin and G. Gauthier



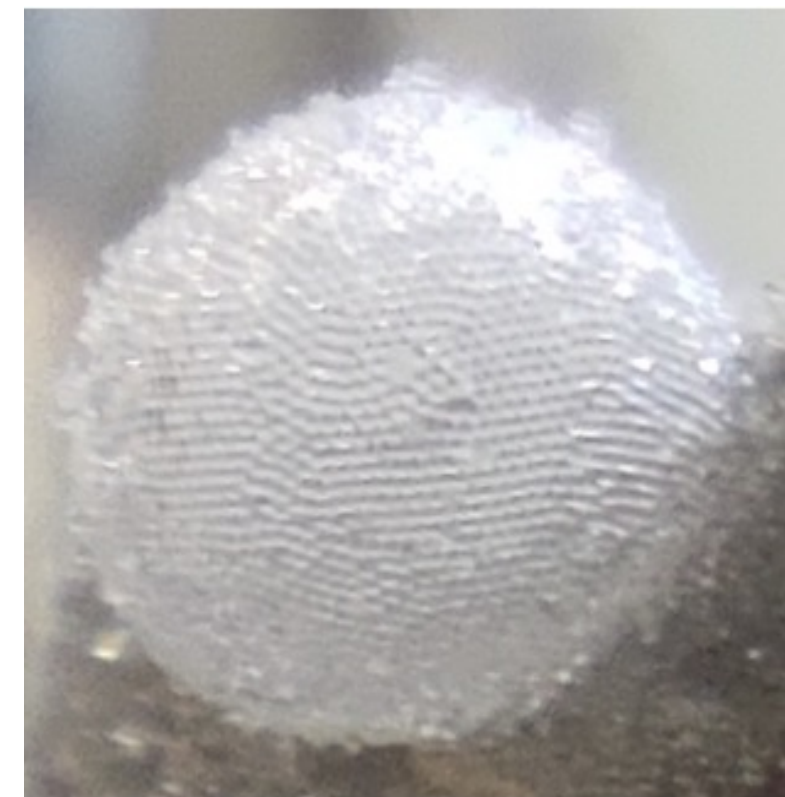
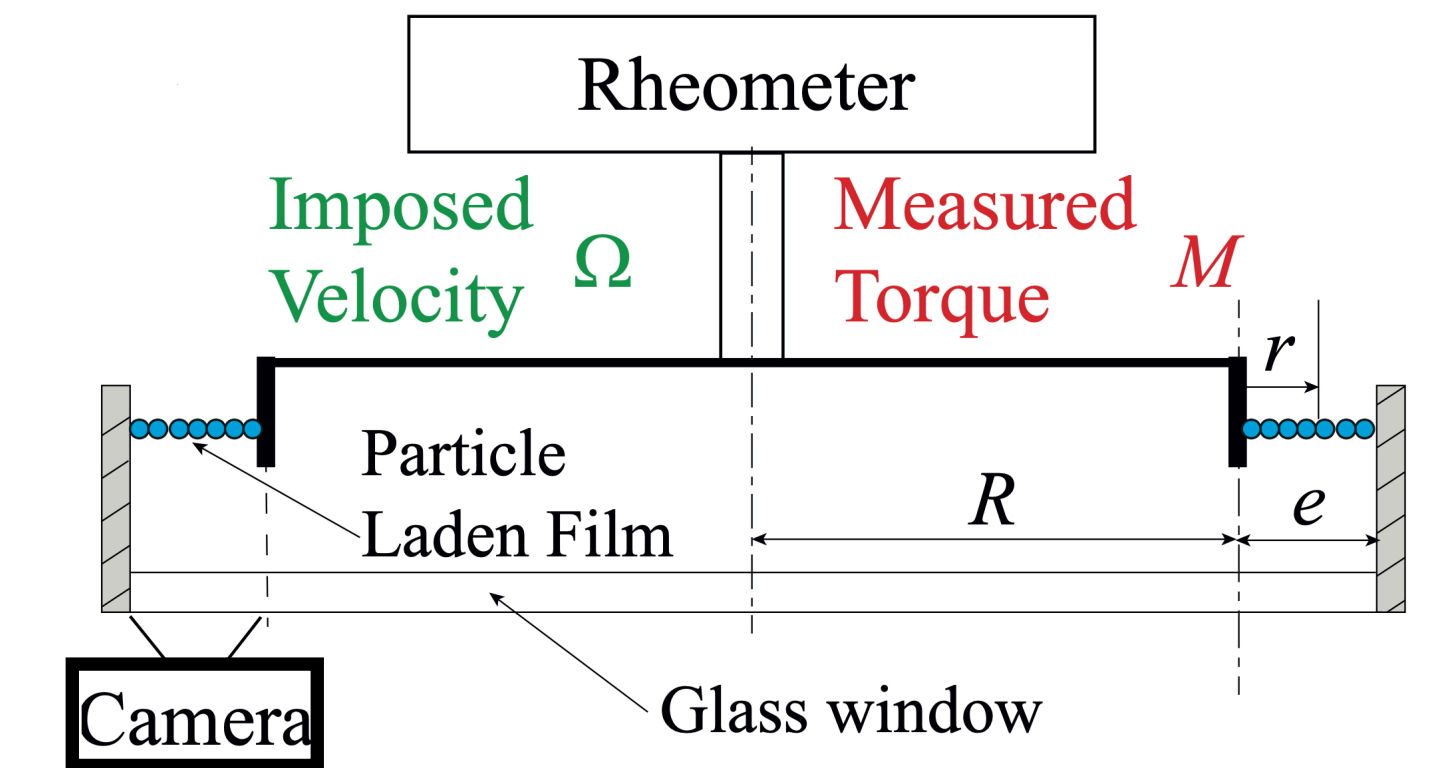
Chimorantis petersii, Kenya,
Joan Root



Feneuil *et al.* Cement and
Concrete Research (2019)



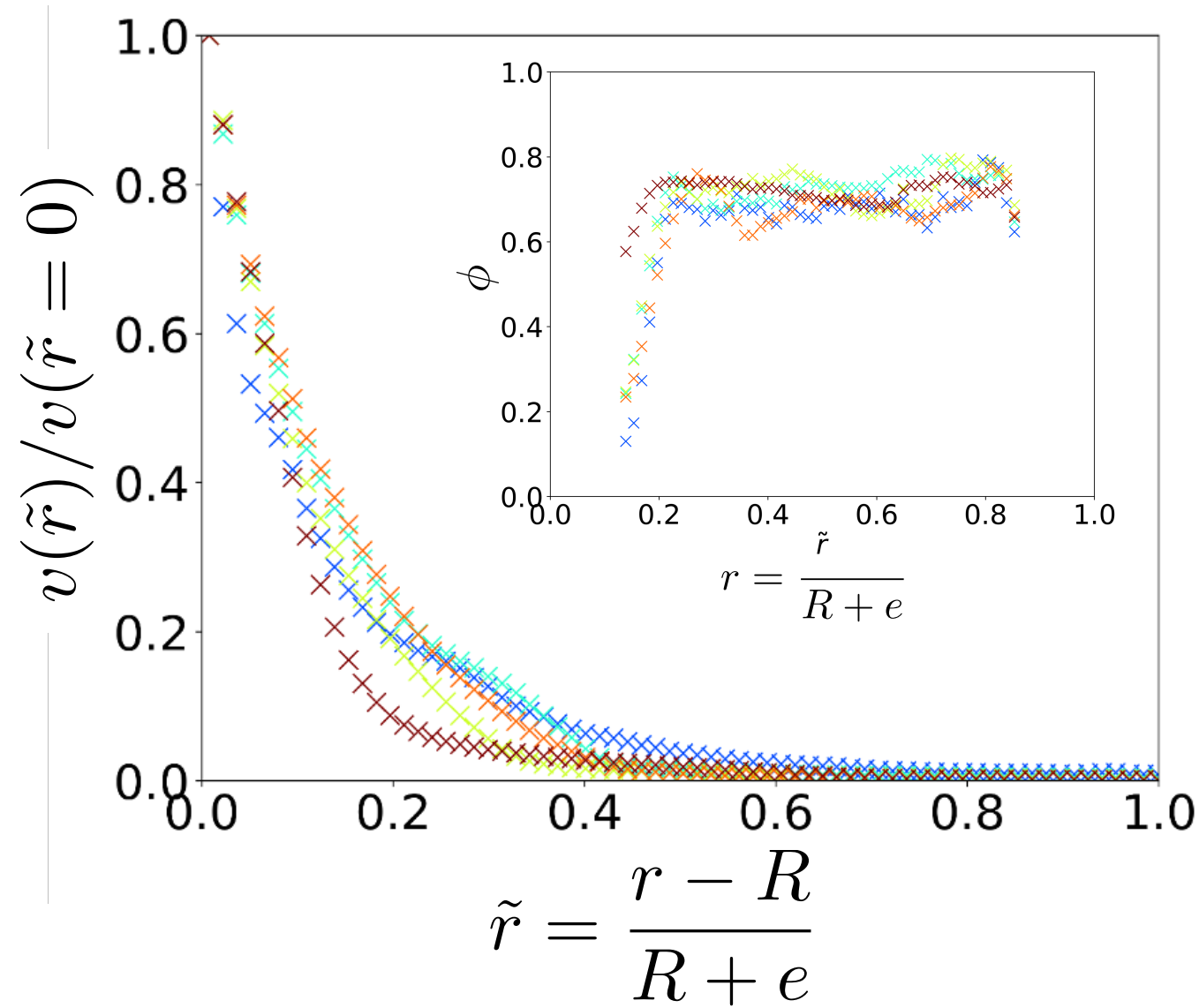
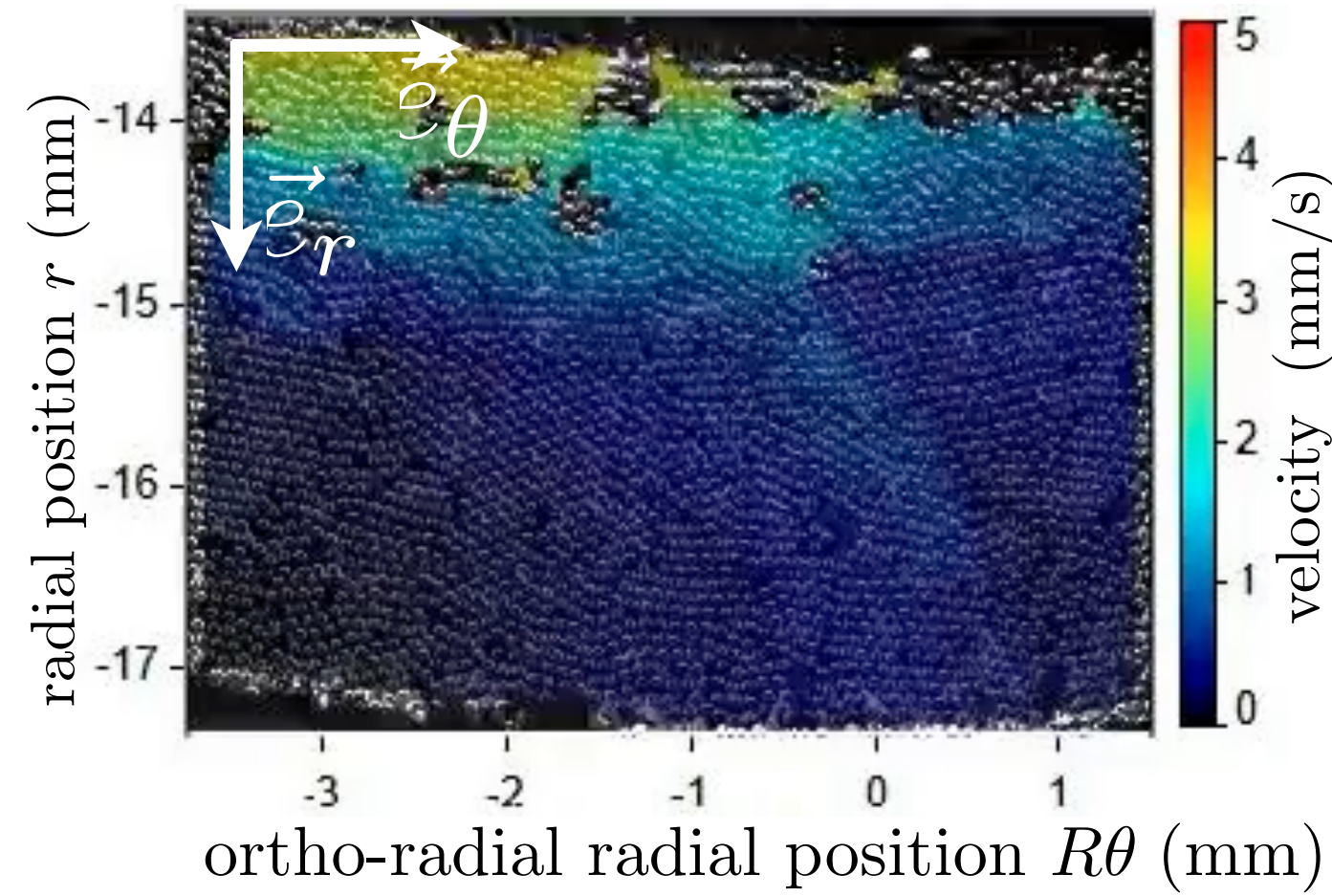
Granular soap film



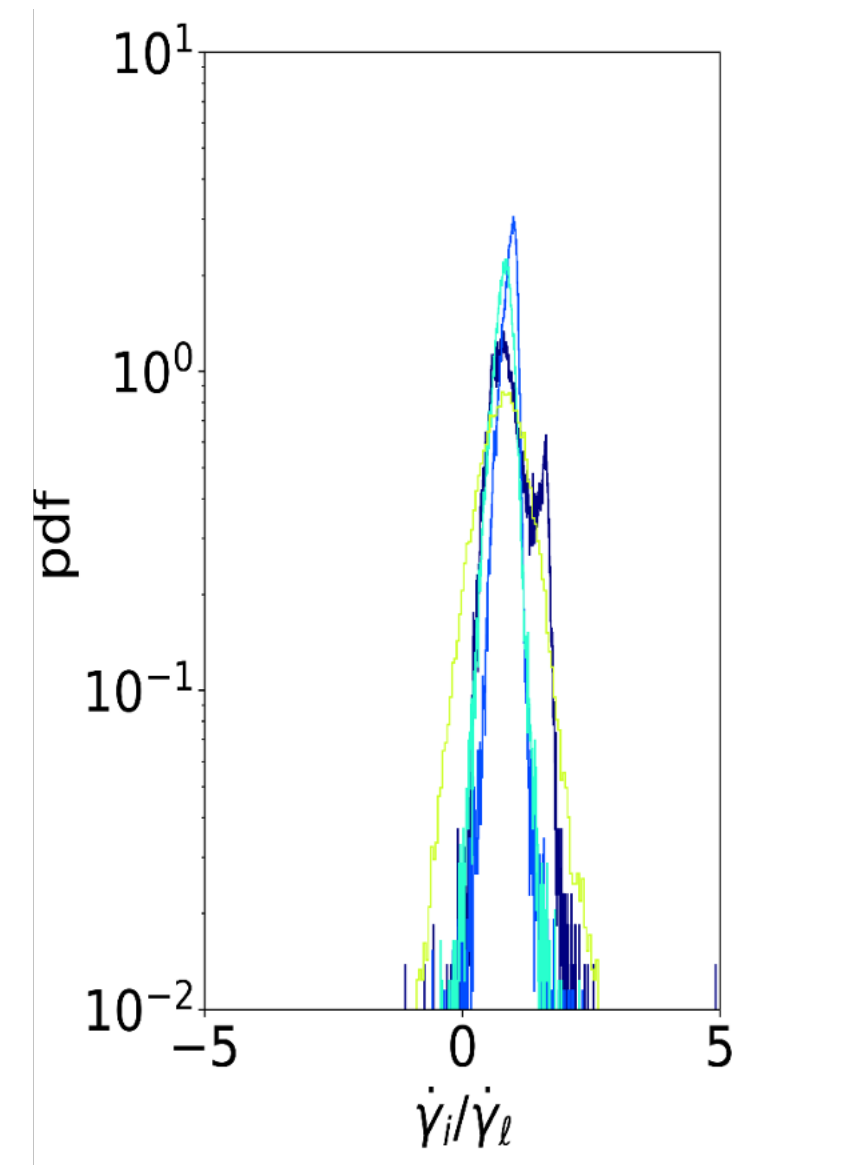
Gas marble

Granular film rheology

Image correlation \Rightarrow Particle velocity field

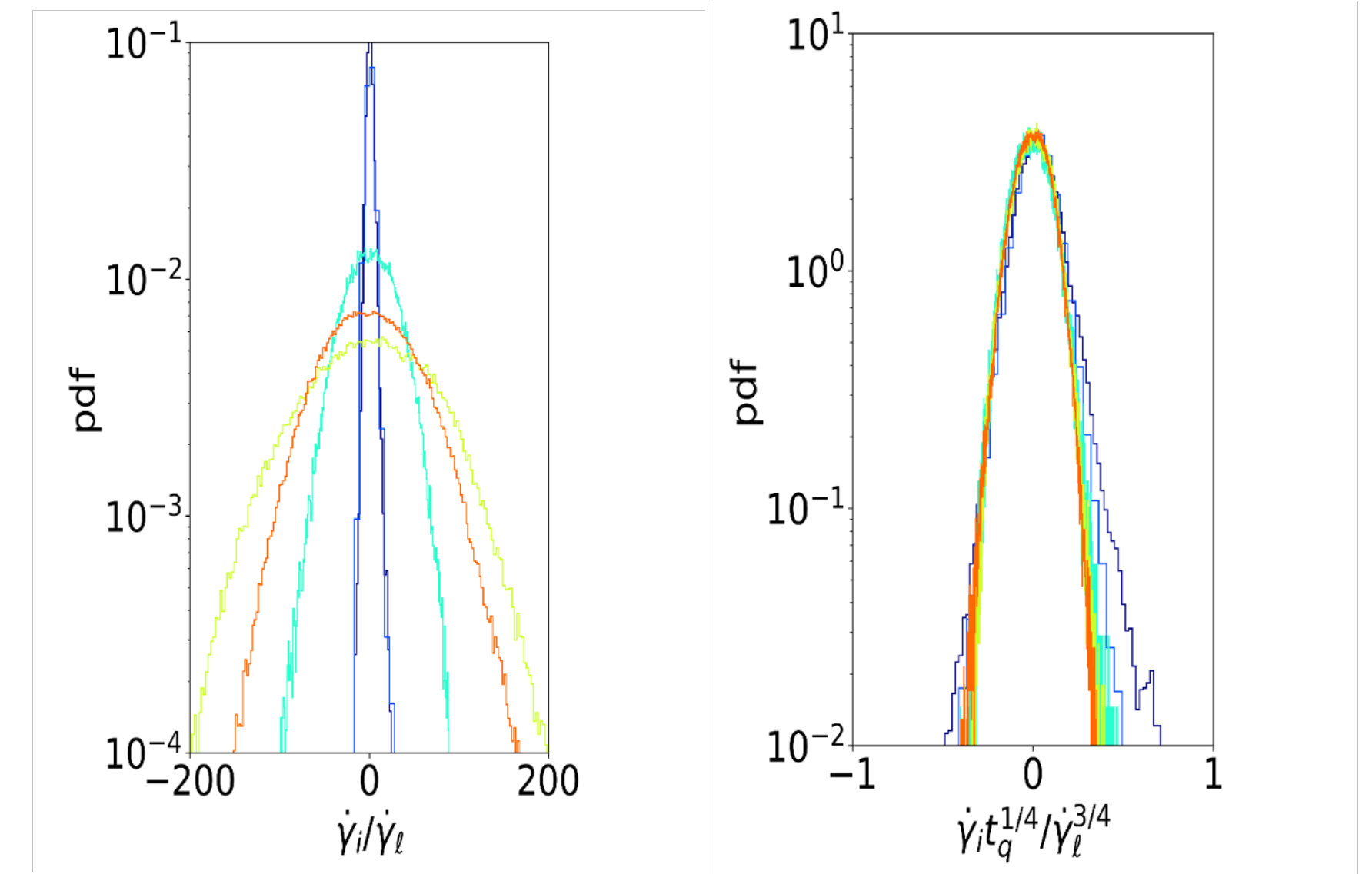


Inertial regime :
Kinetic theory



$$\Delta v \sim \dot{\gamma}$$

Quasi-static regime : elasto-visco-plastic model



$$\tau_v \dot{\gamma} \sim \tau_{el} \dot{\gamma} \quad (\text{Durian 1995})$$

$$\tau_v \sim \dot{\gamma} \quad \tau_{el} \sim \dot{\gamma}^{1/2} \quad (\text{Tighe et al. 2010})$$

$$\Delta v \sim \dot{\gamma}^{3/4} \quad t_q \sim \eta_s / \chi$$

Rencontre du non linéaire