Séminaire

Mardi 22 avril 2025 à 10h30

Amphithéâtre Henri Benoît

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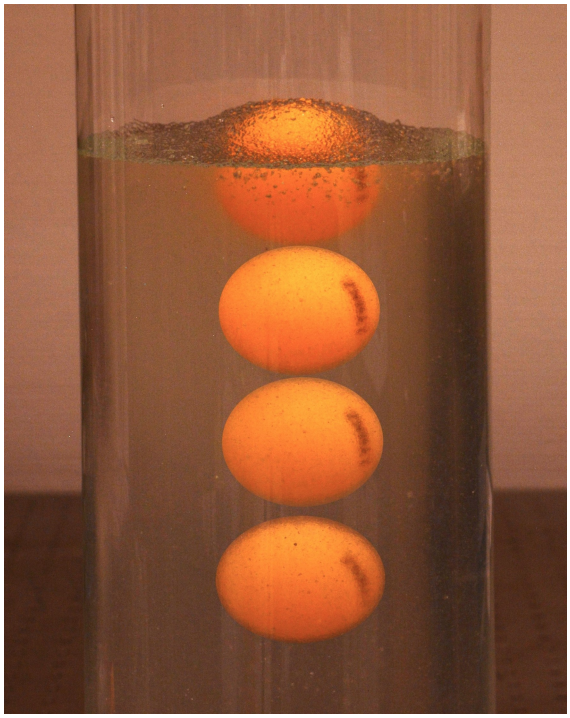
Hydrogel particles: where the polymer ends, and the sphere begins

The flow behavior of dense hydrogel suspensions exhibits a range of remarkable mechanical features. Their mechanics appears to emerge from molecular-level details within the particles. We investigate hydrogel packing mechanics through rheology and custom intruder experiments. We examine both transient and steady-state responses using stress and strain control modes. We observe creep, relaxation behavior following motion, shear history dependence, and more common non-Newtonian characteristics such as Herschel-Bulkley rheology. However, our findings demonstrate that under specific boundary conditions, dense hydrogel packings can exhibit quasi-Newtonian fluid behavior. These results are discussed in the context of the observed multiple relaxation dynamics in particle-level contact mechanics, providing insights into the interplay between microscale interactions and macroscale flow behavior. The microscopic mechanisms underlying the macroscopic flow features remain poorly understood but appear to originate from the polymer length scales within the hydrogels or their contact mechanics.



Les personnes souhaitant rencontrer J. Dijksman sont priées de prendre contact avec Wiebke Drenckhan.