Abstract Submitted
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Wall slip of foams close to the jamming transition S. COHEN-ADDAD[1], Univ Pierre et Marie Curie, M. LE MERRER[2], Univ Lyon, R. LESPIAT, Saint-Gobain, R. HOHLER[3], Univ Pierre et Marie Curie — Aqueous foams are dense packings of gas bubbles in a surfactant solution. They exhibit unique rheological properties [1]. When they flow along a solid smooth wall, they slip and experience viscous drag. This feature is crucial in many applications involving flow through microfluidic channels, pipes or spreading on surfaces. We focus on foams in the vicinity of the jamming transition where the bubbles are quasi spherical with small contact films at the wall and thick liquid channels between bubbles. What are the mechanisms of friction at play at the scale of the films, the channels and the bubbles that are at the origin of the macroscopic friction law? To address this question, we measure the velocity of a bubble monolayer or a wet 3D foam as it creeps along an immersed inclined plane, as a function of the inclination angle, bubble size and confinement. Two regimes of friction are evidenced: In addition to a previously reported non-linear Bretherton-like drag, we present the first direct evidence for a linear Stokes-like drag. We show that the key parameter governing the transition between the regimes is set by the Bond number for the monolayer or the confinement pressure for the foam.

[1] S. Cohen-Addad, R. Hohler, O. Pitois, Annu. Rev. Fluid Mech. (2013), **45**, 241.

[1]Institut des NanoSciences de Paris, sylvie.cohen-addad@insp.upmc.fr
[2]Institut Lumiere Matiere
[3]Institut des NanoSciences de Paris

Sylvie Cohen-Addad
Univ Pierre et Marie Curie

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