# Swimming in foam

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Inspired by the problematic of the trapping of planktonic organisms in marine foams [1], we measured the sedimentation dynamics of a motile micro-algae in a laboratory-generated foam. A liquid foam is made of air bubbles separated by a continuous network of liquid microchannels. Initially the liquid is equally distributed along the height of the foam. Then during the experiment it drains in time out of the foam under the effect of gravity and capillarity. If present in the liquid phase, solid particles are either advected downwards by the flow or trapped in the foam, depending on their size and concentration [2]. We use a model single-cell algae, Chlamydomonas rheinardtii [3]. The algae is homogeneously incorporated in the liquid phase of a foam, buoyant on top of its liquid phase and we measured the temporal evolution of the number of algae released from the foam in the underlying liquid. C. rheinardtii is bi-flagellate, thus motile. We investigated the effect of motility on the transport of algae through the foam, using motile and non-motile (dead) C. rheinardtii, and we show that motile algae are more likely than non-motile to remain trapped in the foam.

[1] L. Seuront, D. Vincent, J.G. Mitchell, J. of Marine Systems 61, 2006 p. 118 (2006)
[2] B. Haffner et.al., J. Colloid Interface Sci. 458 , 200-208 (2015).
[3] M. Polin et.al., Science, 325, p. 487 (2009)

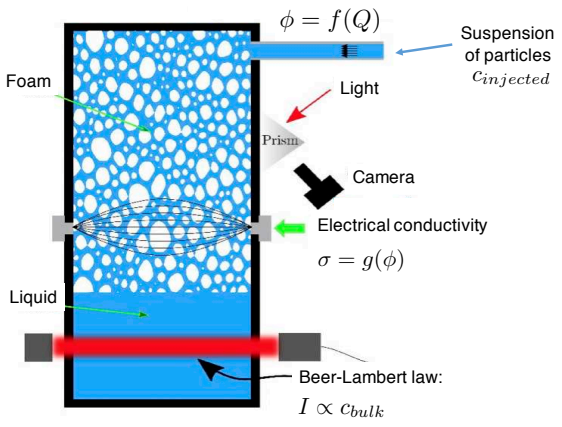


Figure 1: Diagram of the experimental setup