

Abstract Submitted
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Forces exerted by a flowing foam : viscous, elastic and plastic behaviours FRANCOIS GRANER, BENJAMIN DOLLET, Laboratoire de Spectrometrie Physique, 140 rue de la Physique, BP 87, 38402 Martin d'Herès Cedex — We have built a 1 m long, 10 cm wide foam channel, in which we produce 2D foam flows in the range 0.05 - 50 mm/s. In the middle of the channel, we place an obstacle: circle, square, cogwheel, ellipse or airfoil. We perform measurements of the drag, lift and torque exerted by the flowing foam on the obstacle. We observe both a dissipative contribution characteristic of a liquid, and a yielding behaviour typical of a solid. We simultaneously image the foam. In each region of the flow, we measure locally the pressure field, as well as the velocity field, as for a liquid, but also elastic deformation and plastic rearrangements. We discuss how to link the local and global descriptions, and how beyond a few bubble diameters the foam behaves as a continuous material. However, its triple viscous, elastic, plastic behaviour is complex, and most features we observe are not yet explained by current models.

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