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Laboratoire PMMH
10 rue Vauquelin, 75231 Paris Cedex 05

Séminaire PMMH

Bureau d'Études, Bâtiment L, 2 ème étage

Vendredi 11 juillet 2014, 11h00-12h00

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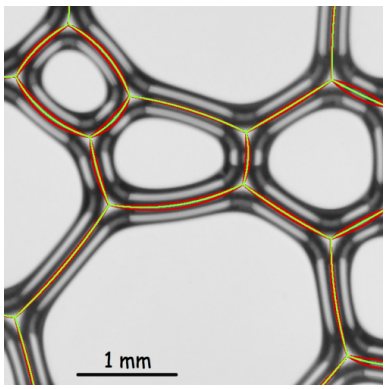
The role of bubble shape in the coarsening of wet 2d foams

We report on the statistics of bubble size, topology, and shape and on their role in the coarsening dynamics for foams consisting of bubbles compressed between two parallel plates. The design of the sample cell permits control of the liquid content, through a constant pressure condition set by the height of the foam above a liquid reservoir. We find that in the scaling regime, all bubble distributions are independent not only of time but also of liquid content. For coarsening, the average rate decreases with liquid content due to the blocking of gas diffusion by Plateau borders inflated with liquid ; we achieve a factor of four reduction from the dry limit. By observing the growth rate of individual bubbles, we find that von Neumann's law becomes progressively violated with increasing wetness and with decreasing bubble size. We successfully model this behavior by explicitly incorporating the border blocking effect into the von Neumann argument. Two dimensionless bubble shape parameters naturally arise, one of which is primarily responsible for the violation of von Neumann's law for foams that are not perfectly dry.
This work was done in collaboration with Adam Roth, Anthony Chieco, Chris Jones, and Jennifer Rieser.



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