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Bubble rearrangements dynamics in foams MARIE LE MERRER, INSP, Univ. Paris 6, SEVERINE COSTA, SYLVIE COHEN-ADDAD, REINHARD HOEHLER, INSP, Univ. Paris 6 / LPMDI, Univ. Paris Est — Liquid foams are jammed dispersions of gas bubbles in a surfactant solution. Their structure evolves with time because surface tension drives a diffusive gas exchange between neighboring bubbles. This coarsening leads to a build-up of stresses which are relaxed upon local intermittent bubble rearrangements. These events govern the slow viscoelastic foam response, and similar bubble rearrangements are the elementary processes of plastic flow. Thus, the rearrangement duration is a key parameter describing how the microstructure dynamics control the macroscopic rheological response. We probe the duration of coarsening-induced rearrangements in 3D foams using a multiple light scattering technique (time resolved Diffusing-Wave Spectroscopy) as a function of the surfactant chemistry and the liquid fraction. As the foam becomes wetter, the confinement pressure of the packing goes to zero and the contacts between bubbles vanish. For mobile interfaces, we find that the rearrangements slow down as the jamming point is approached. These findings are compared to scaling laws which reveal an analogy between rearrangements dynamics in foams and granular suspensions.

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