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Large-scale foam flows: discrete effects and limits of a continuum approach. IGOR VERETENNIKOV, University of Notre Dame, MARIUS ASIPAUSKAS, Glenn Research Center, NASA, JAMES GLAZIER, Indiana University, Bloomington — One might expect a continuum approach to apply to a flowing foam if all spatial scales of the flow are much larger than the size of the individual bubbles. Our experiments on two-dimensional foams flowing through constrictions and around obstacles show that this assumption often fails. Any high-stress regions in the flow cause structural changes (in particular, topological rearrangements (T1 processes)) at preferred locations, which can induce large amplitude jumps in average foam velocity and/or streamline splitting. The resulting flows differ qualitatively from continuum flows (*e.g.* flow velocity may be maximal at a classical stagnation point. Because topological changes always occur at the bubble scale, a continuum description cannot hold. We explain these phenomena qualitatively.

Igor Veretennikov
University of Notre Dame

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