

Viscoelastic liquid curtains.

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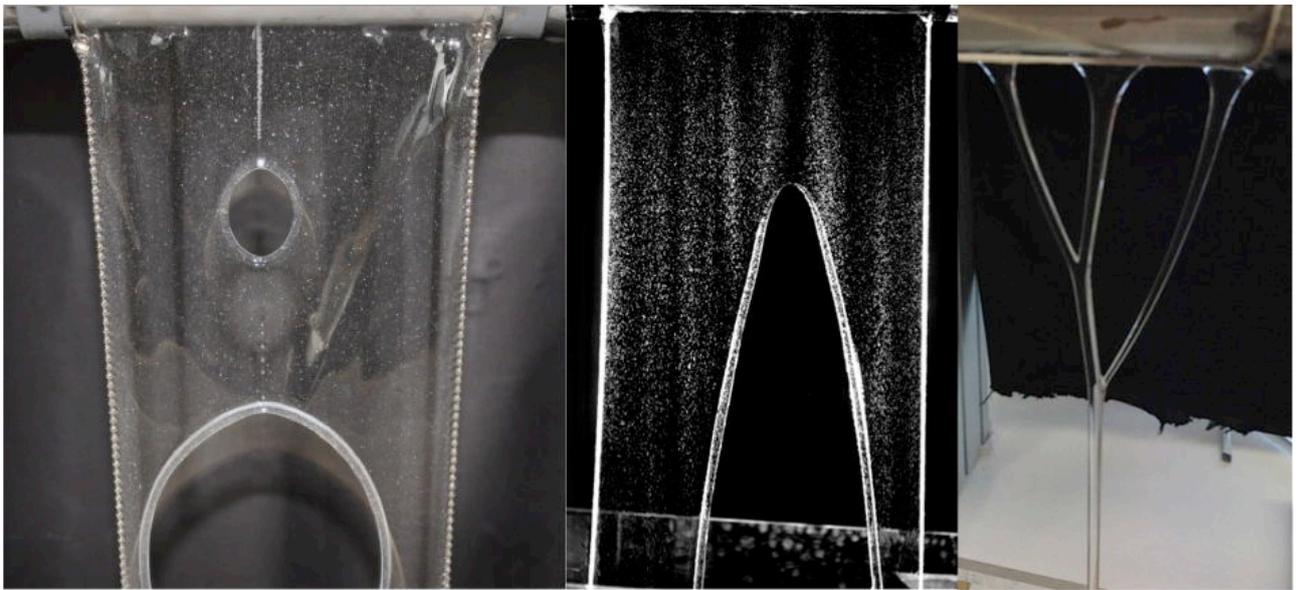


Fig. 1. From left, to right: opening of holes in a bubbly liquid curtain, breaking of a spatially modulated viscoelastic liquid curtains, and strange filament life-tree structures observed at low flow rate.

We have investigated experimentally the properties and stability of viscoelastic curtains, falling from a long thin slot and maintained laterally by two highly wetting wires. We have observed several original facts, compared to the seminal work of Brown and Taylor [1] on Newtonian curtains:

- (1) As yet noticed in [2], the stability with respect to breaking is considerably enhanced by the use of appropriate polymers. Even strange tree-like falling filament structures can also be stabilized.
- (2) Specific instabilities can be observed, when the amount of polymers is excessive, with spatial and temporal modulations of the coating thickness.
- (3) Even the base state is modified, and does NOT reduce at large scale to a free fall, even slightly displaced vertically from the expected profile [3].

We present this experimental exploration and also some attempts of analytical modeling based on Rheological theories of complex fluids [4].

References

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