

Abstract Submitted
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Extensional properties of mobile polymer solutions. CHRISTOPHE TIREL, CORIA, MARIE-CHARLOTTE RE-NOULT, LOMC, CHRISTOPHE DUMOUCHEL, CORIA, OLIVIER CRUMEY-ROLLE, LOMC, DENIS LISIECKI, CORIA, INNOCENT MUTABAZI, LOMC — A deep understanding of the influence of viscoelasticity on the dynamics of liquid flows remains a challenge in the non-Newtonian fluid mechanics field. Previous work has revealed that the addition of minute amount (2.5 part per million) of high molecular weight polymer to water, forming a viscoelastic solution with strong extensional properties, modifies the fission process during droplet snap off with spectacular effects: inhibition of the singularity observed in the reference Newtonian case and formation of a long-lived (milli-second) filament. The measurement of the extensional properties for such mobile polymer solutions is one of the most pressing problem. Here, a global measurement technique, based on the multi-scale analysis of the capillary instability of a free falling jet of a mobile polymer solution, is introduced. The method of analysis allows the characterisation of the jet breakup mechanism from which the relaxation time of the polymer solution can be extracted. One of the advantages of the technique is the simple experiment it requires.

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