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ÉCOLE SUPÉRIEURE DE PHYSIQUE ET DE CHIMIE INDUSTRIELLES DE LA VILLE DE PARIS

Séminaire PMMH

Bureau d'Études, Bâtiment L, 2^{ème} étage

Vendredi 1^{er} juillet 2016, 11h00-12h00

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Extension dominated flows at the microscale : from instabilities to optimisation

The use of microfluidic devices has found applications in a range of different areas, many of which make use of complex fluids, such as biofluids and polymer solutions that exhibit viscoelastic behaviour. Taking advantage of the sub-millimetre length scales in microfluidic devices, we are able to probe regions in the Weissenberg (Wi) - Reynolds (Re) number space typically unreachable at the macro-scale, i.e. high Wi and low Re . This ability makes these platforms very interesting for studies that require high elasticity numbers ($El=Wi/Re$). Here, we focus on the use of microfluidic platforms to study flows of viscoelastic fluids with a strong extensional component, such as the cross-slot and contraction flow devices. In particular, we examine elastic driven flow instabilities that develop even under inertialess flow conditions. We discuss the different flow transitions which appear depending on the fluid rheology, the device geometry, Wi and Re . We also look into the optimisation of microfluidic devices for homogeneous extension deformation, with applications in extensional rheology, in which case we typically want to harness these elastic instabilities as much as possible to obtain the ideal flow field.

Prochain séminaire : vendredi 8 juillet, Manoj Chaudhury (Lehigh University)

Programme des séminaires : www.pmmh.espci.fr, onglet *Séminaires PMMH*

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