

LadHyX Seminar – September 3rd, 10:45

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Viscous jets submerged in a flow field: modelling an unbounded microfluidic wet-spinning approach.

Production of microfibres typically starts with a polymer solution or melt, which is then thinned by external means before solidifying. In this talk, I will demonstrate how submerged miscible fluid jets can be used to produce microfibres with sub-100-micron thicknesses. The fabrication method involves bending, entraining, and thinning of a photopolymerisable pre-fiber jet by the influence of an adjacent fast-flowing water jet, before being polymerised by UV light. The chosen conditions enable the production of fibres that are significantly thinner than the jet nozzles used. I will talk about ongoing work in modelling the interaction of thin, viscous jets with a flow field, using elements of Kirchhoff theory. Kirchhoff formulations for slender structures involve assigning costs to deformations; equilibrium shapes adopted by these slender viscous jets minimize those costs.