Existence theory for beam fluid systems

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In this talk, we consider a family of systems describing the interactions between a film of fluid deposited on a horizontal substrate and a beam delimiting the upper boundary of the film. The fluid motion is described with the incompressible Navier Stokes equations. The beam is assumed to move vertically only. Several models are proposed depending on whether damping/viscosity terms are included or not. The coupling between the fluid and the beam is imposed by prescribing continuity of velocity-fields and normal stress.

These systems have been thorouhgly studied in the recent years especially to develop a Cauchy for strong/weak solutions up to the possible first time of contact between the moving beam and the substrate. In this talk, I will present several results obtained in collaboration with Céline Grandmont, Julien Lequeurre and Jean-Jérôme Casanova. Such results are motivated by obtaining a global-in-time existence theory for such fluid-beam problems and discuss the influence of the damping/viscosity terms in the beam equation.