

**数学与系统科学研究院**

**计算数学所学术报告**

**报告人: Dr. Paul Vigneaux**

**(CNRS and University of Savoie – France)**

**报告题目: On numerical analysis of  
surface tension–driven bifluid flows**

**邀请人: 袁礼研究员**

**报告时间: 2007年11月12日(周一)  
下午 16:30—17:30**

**报告地点: 科技综合楼三层 311  
计算数学所报告厅**

**Abstract:**

**Models for incompressible immiscible bifluid flows with surface tension are here considered. Since Brackbill, Kothe and Zemach (J. Comput. Phys. 100, pp 335-354, 1992)**

**introduced the Continuum Surface Force (CSF) method, many methods involved in interface tracking or capturing are based on this reference work. Particularly, the surface tension term is discretized explicitly and therefore, a stability condition is induced on the computational time step. This constraint on the time step allows the containment of the amplification of capillary waves along the interface and puts more emphasis on the terms linked with the density in the Navier-Stokes equation (i. e. unsteady and inertia terms) rather than on the viscous terms. Indeed, the viscosity does not appear, as a parameter, in this stability condition. We propose a new stability condition which takes into account all fluid characteristics (density and viscosity) and for which we present a theoretical estimation. We detail the analysis which is based on a perturbation study - with capillary wave - for which we use energy estimate on the induced perturbed velocity. We validate our analysis with numerical simulations of microfluidic flows where microdroplets are formed and transported in microchannels.**

**欢迎大家参加！**