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Lattice-Boltzmann simulation of a confined tank-treading vesicle under shear BADR KAOUI, Technische Universiteit Eindhoven (Eindhoven, The Netherlands) and CNRS - Universite de Grenoble I (Grenoble, France), JENS HARTING, Technische Universiteit Eindhoven (Eindhoven, The Netherlands) and Universitaet Stuttgart (Stuttgart, Germany) , CHAOUQI MISBAH, CNRS - Universite de Grenoble I (Grenoble, France) — Dynamics of a vesicle under shear flow between two parallel plates is studied using lattice-Boltzmann simulations. We first present how we adapted the lattice-Boltzmann method to simulate vesicle dynamics basing on the same approach as the one used in the immersed boundary method. The fluid flow is computed on an Eulerian regular fixed mesh while the location of the vesicle membrane is tracked by a Lagrangian moving mesh. As benchmarking tests, the known vesicle equilibrium shapes in a fluid at rest are found and the dynamical behavior of a vesicle under simple shear flow is being reproduced. Further, we focus on investigating the effect of confinement on the dynamics. In particular we study how the vesicle's steady inclination angle in the tank-treading regime depends on the degree of confinement (the ratio of the effective radius of the vesicle to the half height of the channel). The effective viscosity of the fluid, in the presence of the vesicle, is also measured and the influence of the confinement on it is analysed. Both the inclination angle and the membrane tank-treading velocity are found to decrease with increasing confinement.

Badr Kaoui
Technische Universiteit Eindhoven (Eindhoven, The Netherlands)

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