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Surface effects on nanoscale Poiseuille flows under large driving force CHONG LIU, ZHIGANG LI, Department of Mechanical Engineering, The Hong Kong University of Science and Technology — The advances in nanotechnology make the miniaturization of fluidic devices possible. The reduction in the dimension of fluidic devices from micro- to nanoscale requires a deep understanding of the static and dynamic properties of nanoscale flows. In this work, we examine the effects of fluid-wall interaction on the fluid flux of nanoscale Poiseuille flows under large external driving force. The mass flux of liquid Ar and He confined by two parallel planar walls are measured by molecular dynamics simulations. For liquid Ar, a bimodal behavior in the flux is observed as the effective surface effect is varied. However, the bimodal behavior for Ar is not observed for He. At weak fluid-wall interactions, the flux of He is independent of fluid-wall binding energy, while it decreases monotonously with increasing fluid-wall binding energy when the fluid-wall interaction is strong.

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