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An atomistic model for the Navier slip condition NICOLAS HADJICONSTANTINOU, Mechanical Engineering, MIT — The behavior of a fluid at the interface with a solid boundary is affected, to a large extent, by the potential landscape imposed on the fluid by the solid. In previous work [Wang and Hadjiconstantinou, *Phys. Rev. Fluids*, 2, 094201, 2017] we have shown how this potential gives rise and determines the layering observed at the fluid-solid interface. In this presentation we discuss how fluid slip at the interface with a solid boundary can be modeled as forced Brownian motion in a periodic potential landscape. The resulting model goes beyond simple transition-state-theory approaches and uses well-defined atomistic parameters to capture the salient features of the slip process in both the linear and non-linear forcing regimes, yielding excellent agreement with MD simulation results, as well as previous modeling results. An explicit expression for the Navier slip coefficient in terms of molecular-level system parameters is derived.

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