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Weiying Ren* (weiying@cims.nyu.edu), 251 Mercer Street, New York, NY 10012. *Coupled atomistic-continuum methods for fluid.*

I will present a multiscale method for the study of fluid systems with unknown constitutive relations and/or boundary conditions. The multiscale method captures the macroscale behavior of the fluid system using molecular dynamics. In the multiscale method, the continuum and atomistic models are coupled in a seamless way that does not require going back and forth between the macro and micro states of the system. I will discuss the details of the coupling scheme, its application to complex fluids, and also the major difficulties in implementation. I will also discuss some typical instabilities that can arise in coupled atomistic-continuum methods. (Received January 20, 2008)