

Abstract Submitted  
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**Multiscale Modeling of Polymer Rheology** SUBHRANIL DE, JACOB FISH, MARK SHEPHARD, PAWEL KEBLINSKI, SANAT KUMAR — We propose a novel simulation method which can be used to readily parallelize simulations on systems with a large spatial extent. We simulate small parts of the system with independent molecular dynamics simulations, and only occasionally pass information between these simulations through a constitutive model free continuum approach. We illustrate the power of this method in the case of a polymeric fluid undergoing rapid one dimensional shear flow. Since we show that this flow problem cannot be modeled by using a steady-state constitutive model, this method offers the unique capability for accessing the non-linear viscoelasticity of complex fluids.

Daniel Sperber

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