

Abstract Submitted  
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**Shear thinning near the rough boundary in a viscoelastic flow** SAYED HASAN, SERGEI OBUKHOV, Department of Physics, University of Florida — It was first noticed by de Gennes, that because of huge difference between viscosities of entangled polymeric liquid and monomeric liquid, the boundary conditions for a polymer flow near microscopically smooth boundary should be assumed as “slip”. Nevertheless, in the presence of surface roughness, or undulations, the flow is characterized by mixed boundary conditions. We had shown that at certain slip velocities the deformation of the melt near the rough (undulated) boundary might become more elastic than viscous. This results in “shear thinning” of the roughness of boundary. At higher velocities, near the slip boundary, the chains can be considered simply trapped in an entangled mesh of other chains. They are subjected to oscillating strain rate, comparable to frequencies of internal Rouse modes of these chains. We calculate the total dissipation of energy due to oscillating strain and calculate the slippage of the polymer melt near the boundary as function of velocity, undulation wavelength and amplitude.

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