

SOCIETY OF PHYSICS STUDENTS (SPS) EVENT

Bead-Spring Model for Molecular Dynamics in a Creeping Flow

(Research Advisors - Dr. Fodor and Dr. Kaufman)

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Abstract:

In polymer physics, beads connected by springs chain model is often used to understand the dynamics of linear polymers. In our project, we simulated the motion of such a chain being advected by a fluid in a rectangular microchannel. We considered the creeping laminar flow, i. e. zero Reynolds number. The differential equations of motion for each bead were solved numerically using 4th order Runge-Kutta technique. The dynamics of this nonlinear mechanical system is studied as a function of model parameters: the spring equilibrium distance, the mass of a bead, the spring constant, and fluid initial velocity. Advanced techniques such as largest Lyapunov exponent calculation and fast Fourier transform are used to characterize the motion of the system

WHERE

SI – 117

WHEN

Noon- 1pm

Tuesday, November 22, 2011