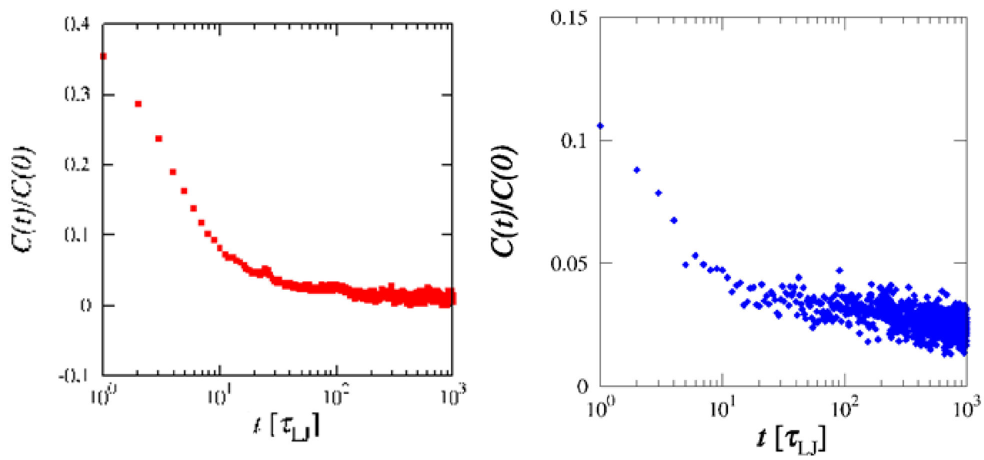
Supplementary Information

Pressure Time Correlation Function

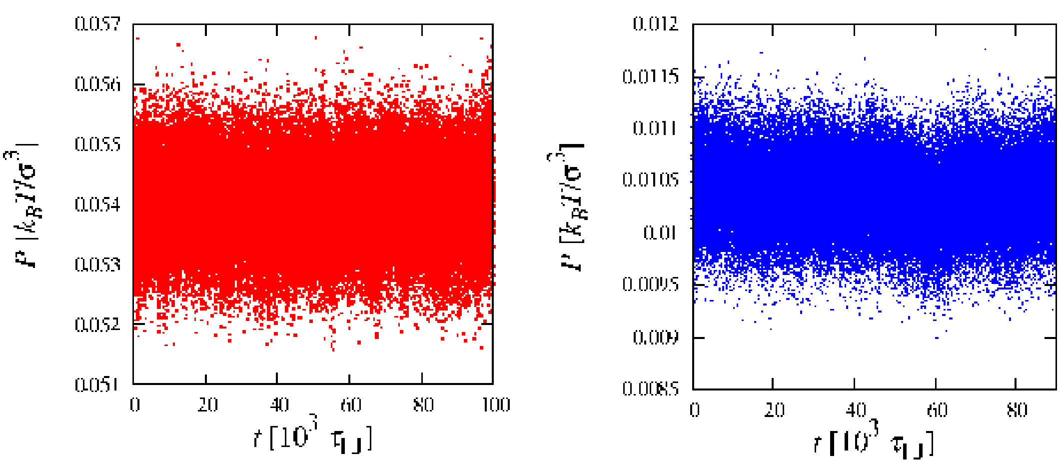
The Rouse time is usually a good estimate of the correlation between events that occur on the time scale of the individual chain relaxation. However, in semidilute salt-free polyelectrolyte solutions relaxation of density fluctuations and system pressure occurs much faster and is on the order of the relaxation time of the correlation blob (for our thermostat it is a Rouse time of the section of the chain inside correlation blob). For charged systems at higher salt concentrations this time becomes even shorter and is controlled by relaxation on the length scales on the order of the screening length. To illustrate this point in Figure SI1 we plot time dependence of the pressure time correlation function, $C(t) = \langle P(\tau + t)P(\tau)\rangle - \langle P\rangle^2$, for several polymer and salt concentrations, $c_p = 0.0005\ \sigma^{-3}$; $2c_s = 0.05\ \sigma^{-3}$ (red) and $c_p = 0.001\ \sigma^{-3}$; $2c_s = 0.01\ \sigma^{-3}$ (blue). The plots start at $t = \tau_{LJ}$ and the first point $C(0)/C(0)$ is not shown.

Figure SI1. Pressure time correlation function.



In Figure SI2 we plot evolution of the pressure during the simulation run. The average reaches saturation after ~$10^4\ \tau_{LJ}$. Thus our simulations are long enough to sample statistically independent events.

Figure SI2. Evolution of the pressure.



Data Block Averaging Results

To perform block averaging of our simulation data we have used the following procedure:

1. Have divided simulation run of the length N_{sim} into n_B blocks of length B, $n_B = N_{\text{sim}}/B$ (Our sampling rate was τ_{LJ}).
2. For each block we have calculated the average pressure:

$$\langle P_b \rangle = \frac{1}{B} \sum_{i=bB+1}^{B(b+1)} P_i \tag{1}$$

3. Have calculated variance of the block averages:

$$\sigma^2(\langle P_B \rangle) = \frac{1}{n_B} \sum_{b=1}^{n_B} (\langle P_b \rangle - \langle P \rangle)^2 \tag{2}$$

where $\langle P \rangle = N_{\text{sim}}^{-1} \sum_{i=1}^{N_{\text{sim}}} P_i$ is the average pressure during the whole simulation run and for normalization we used $\sigma^2 = \frac{1}{N_{\text{sim}}} \sum_{j=1}^{N_{\text{sim}}} P_j^2 - \langle P \rangle^2$.

Figure SI3. Block averaging results.