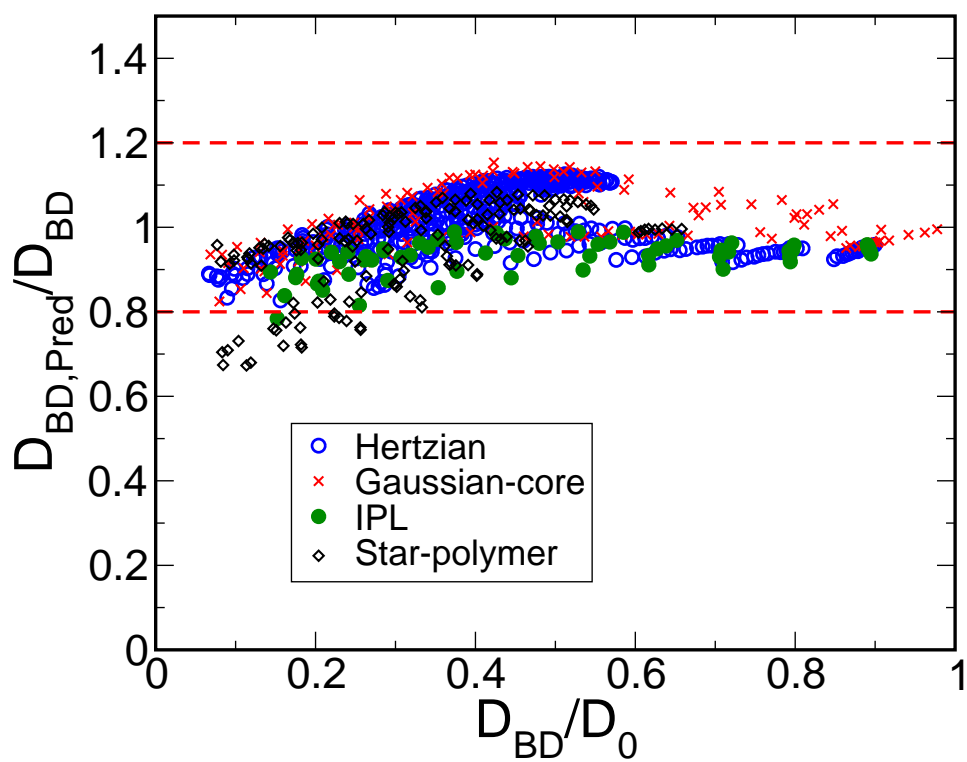
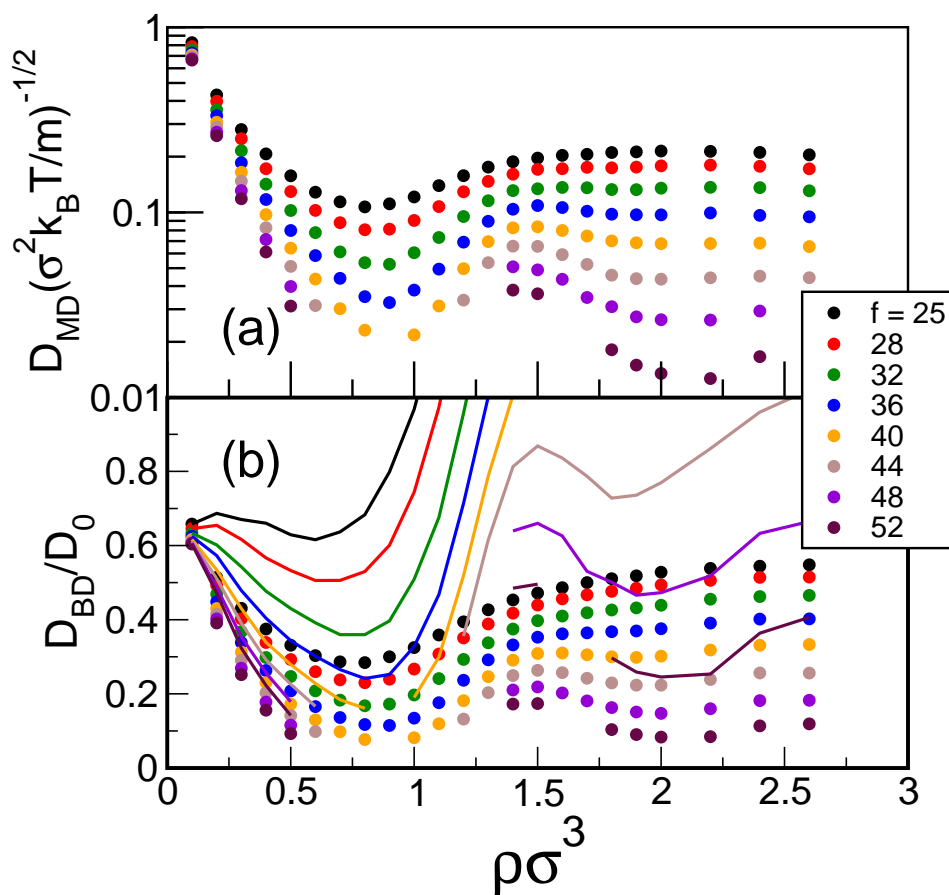


### Electronic Supplementary Information



**Figure S1.** Ratio of long-time BD diffusivity estimated from eq. 1 in the text,  $D_{BD, Pred}$ , to that obtained from simulation,  $D_{BD}$ , plotted as a function of  $D_{BD}/D_0$ . The dashed red lines represent a 20% deviation of the predicted diffusivity from the value measured in simulation.



**Figure S2.** Long-time diffusivity of the star-polymer system from MD and BD simulations. Symbols are the same as in Figure 2 of the main text. Curves in panel (b) show prediction based on  $D_{BD}/D_0 = (D_{MD}) / ([\rho D]_0 / \rho)$ , where  $[\rho D]_0 = \lim_{\rho \rightarrow 0} \rho D_{MD}$  [1].

## References

- [1] Leticia Lopez-Flores, Patricia Mendoza-Mendez, Luis E. Sanchez-Diaz, Gabriel Perez-Angel, Martn Chavez-Paez, Alejandro Vizcarra-Rendon, and Magdaleno Medina-Noyola. Dynamic equivalence between atomic and colloidal liquids. *arXiv:1106.2475v1*, 2011.