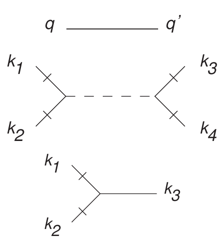

$$\frac{k_{\mathrm{B}}T}{\kappa q^4 - \frac{pR}{2}q^2 + \frac{Y}{R^2}}(2\pi)^2\delta^2(\mathbf{q}+\mathbf{q}')$$

$$\frac{Y}{8}[P^{\mathrm{T}}_{ij}(\mathbf{k}_1+\mathbf{k}_2)k_{1i}k_{2j}][P^{\mathrm{T}}_{lm}(\mathbf{k}_3+\mathbf{k}_4)k_{3l}k_{4m}](2\pi)^2\delta^2(\mathbf{k_1}+\mathbf{k_2}+\mathbf{k_3}+\mathbf{k_4})$$

$$\frac{Y}{2R}[P^{\mathrm{T}}_{ij}(\mathbf{k}_1+\mathbf{k}_2)k_{1i}k_{2j}](2\pi)^2\delta^2(\mathbf{k_1}+\mathbf{k_2}+\mathbf{k_3})$$

Fig. S2. The bare propagator for $f_{\mathbf{q}}$ and the vertices arising from the nonquadratic terms in G_{eff}. The slashes on specific legs denote spatial derivatives. $P^{\mathrm{T}}_{ij}(\mathbf{q}) = \delta_{ij} - q_iq_j/q^2$ is the transverse projection operator in momentum space. Note an unusual feature of this graphical perturbation theory: The system size, i.e., the sphere radius R, enters explicitly both in the propagator and as a coupling constant in the third-order interaction vertex.