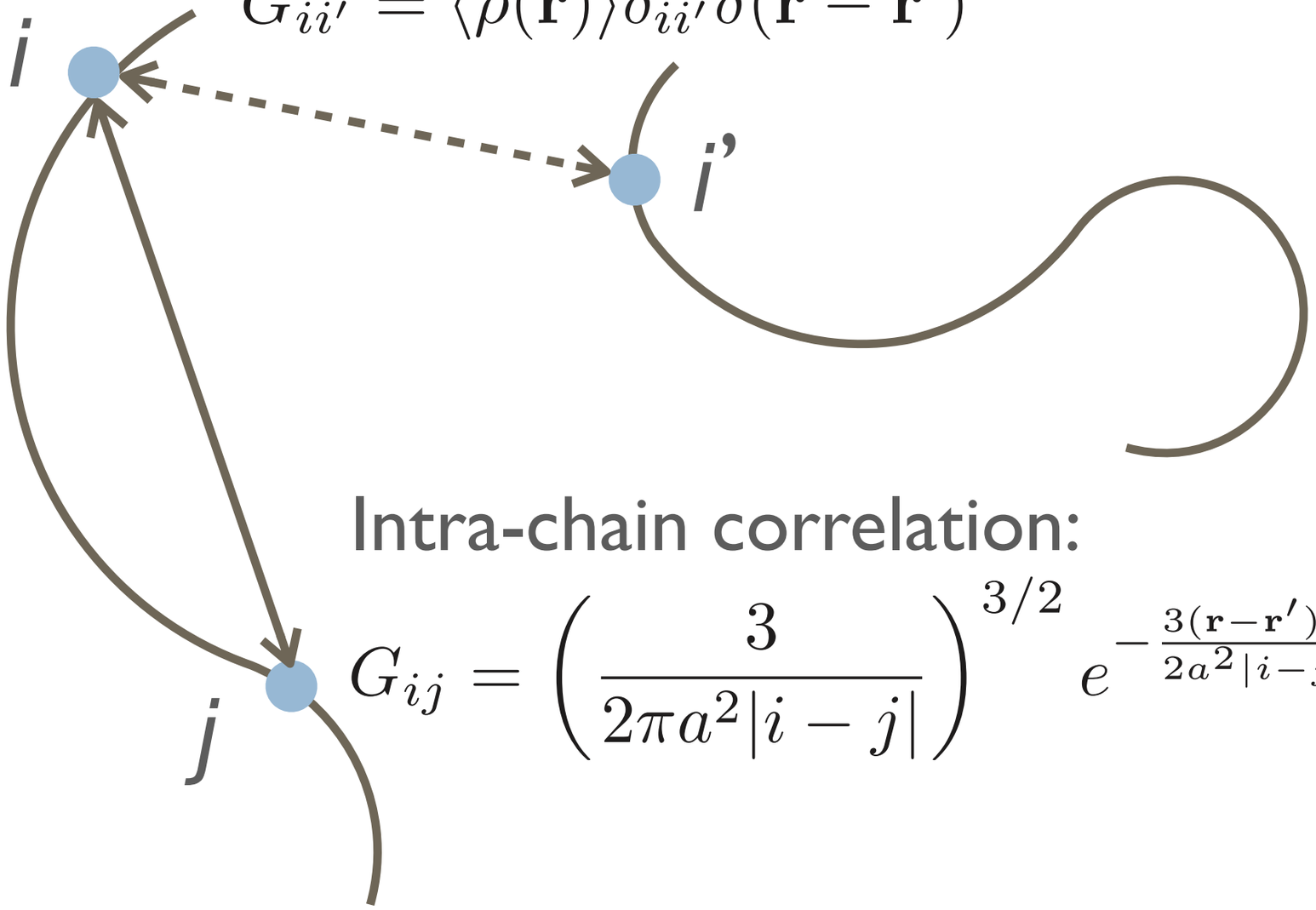
$$G(\mathbf{r}-\mathbf{r}') = \langle \delta\phi(\mathbf{r})\delta\phi(\mathbf{r}')\rangle \neq 0$$

$$\phi(\mathbf{r}) \approx \langle\phi(\mathbf{r})\rangle \equiv \phi \; ; \; \langle\phi(\mathbf{r})\rangle \approx 0$$

Inter-chain correlation

$$G_{ii'} = \langle\rho(\mathbf{r})\rangle\delta_{ii'}\delta(\mathbf{r}-\mathbf{r}')$$



Intra-chain correlation:

$$G_{ij} = \left(\frac{3}{2\pi a^2|i-j|}\right)^{3/2} e^{-\frac{3(\mathbf{r}-\mathbf{r}')^2}{2a^2|i-j|}}$$

$$f_{\mathrm{el}} = \int_0^\infty \frac{dkk^2}{4\pi^2}\left\{\ln\left[1+\mathcal{G}(k)\right]-\mathcal{G}(k)\right\}$$

$$\mathcal{G}(k) = \frac{a}{\epsilon k_{\mathrm{B}}T[k^2(1+k^2)]}\left(2\phi_s+\phi_c+\frac{\phi_m}{N}\sum_{i,j=1}^{N}\sigma_i\sigma_j e^{-\frac{k^2}{6}|i-j|}\right)$$