

$$\mathcal{D}^a(\omega) = \frac{2\zeta^{\text{abc}}}{\hbar (\xi^{\text{bb}}\xi^{\text{cc}})/2}$$

$$\zeta^{\text{abc}}(\omega) = \frac{i\pi e^2}{\hbar^2} \int \frac{d^3k}{8\pi^3} \sum_{vcc'} ' \text{Im} \left[S_{c'c}^{\text{a}}(\mathbf{k}) r_{vc'}^{\text{b}}(\mathbf{k}) r_{cv}^{\text{c}}(\mathbf{k}) + \right. \\ \left. S_{cc'}^{\text{a}}(\mathbf{k}) r_{vc}^{\text{b}}(\mathbf{k}) r_{c'v}^{\text{c}}(\mathbf{k}) \right] \delta(\omega_{cv}(\mathbf{k}) - \omega)$$

$$\xi^{\text{ab}}(\omega) = \frac{2\pi e^2}{\hbar^2} \int \frac{d^3k}{8\pi^3} \sum_{vc} r_{vc}^{\text{a}}(\mathbf{k}) r_{cv}^{\text{b}}(\mathbf{k}) \delta(\omega_{cv}(\mathbf{k}) - \omega)$$