

$$A_{\downarrow}(\omega, k) = \text{Im} \left(\omega - \epsilon_k^{\downarrow} - \Sigma_{\downarrow}(\omega, k) \right)^{-1}$$

$$\Sigma_{\downarrow}(\omega, k) = \int dz \Gamma_{\downarrow}(z, k) / (2\pi(\omega - z))$$

$$\Gamma_{\downarrow}(\omega, k) = \int_{0 < \epsilon_k < \omega} d^3q / (2\pi)^3 \Lambda(\omega + \epsilon_q^{\uparrow}, k + q)$$

$$\Lambda(\omega, k) = 2\text{Im}T(\omega, k)$$

$$T(\omega, k) = (4\pi\hbar^2/m) / (a^{-1} + \Theta(\omega, k))$$

$$\Theta(\omega, k) = \int \frac{dz}{2\pi(\omega - z)} \int \frac{d^3q}{(2\pi)^3} \left[\frac{1 - f_{k/2+q}^{\uparrow} - f_{k/2-q}^{\downarrow}}{\omega - \epsilon_{k/2+q}^{\uparrow} - \epsilon_{k/2-q}^{\downarrow}} - \frac{m}{k^2} \right]$$