

We now allow the SDW field  $\vec{\varphi}$  to be dynamical, coupling to electrons as

$$H_{\text{sdw}} = - \sum_{\mathbf{k}, \mathbf{q}, \alpha, \beta} \vec{\varphi}_{\mathbf{q}} \cdot c_{\mathbf{k}, \alpha}^{\dagger} \vec{\sigma}_{\alpha\beta} c_{\mathbf{k}+\mathbf{K}+\mathbf{q}, \beta}.$$

Exchange of a  $\vec{\varphi}$  quantum leads to the effective interaction

$$H_{ee} = -\frac{1}{2} \sum_{\mathbf{q}} \sum_{\mathbf{p}, \gamma, \delta} \sum_{\mathbf{k}, \alpha, \beta} V_{\alpha\beta, \gamma\delta}(\mathbf{q}) c_{\mathbf{k}, \alpha}^{\dagger} c_{\mathbf{k}+\mathbf{q}, \beta} c_{\mathbf{p}, \gamma}^{\dagger} c_{\mathbf{p}-\mathbf{q}, \delta},$$

where the pairing interaction is

$$V_{\alpha\beta, \gamma\delta}(\mathbf{q}) = \vec{\sigma}_{\alpha\beta} \cdot \vec{\sigma}_{\gamma\delta} \frac{\chi_0}{\xi^{-2} + (\mathbf{q} - \mathbf{K})^2},$$

with  $\chi_0 \xi^2$  the SDW susceptibility and  $\xi$  the SDW correlation length.