

$$\mathcal{U}_{1234;\sigma\sigma'}^{\mathbf{q}\mathbf{k}\mathbf{k}'} \equiv \sigma \begin{array}{c} 1 \\ 2 \end{array} \left(\mathcal{U}_{1234}^{\mathbf{q}\mathbf{k}\mathbf{k}'} \right) \begin{array}{c} 4 \\ 3 \end{array} \sigma' = \begin{array}{c} 2 \\ 1 \end{array} \overset{\mathcal{U}_{1234}^{\mathbf{q}}}{\sim} \begin{array}{c} 3 \\ 4 \end{array} - \delta_{\sigma\sigma'} \begin{array}{c} 1 \\ 2 \\ \sim \\ 4 \\ 3 \end{array} \tilde{\mathcal{U}}_{1234}^{\mathbf{k}-\mathbf{k}'}$$