

$$\begin{aligned}
|\Psi\rangle &= \left[\phi_0 a_{\downarrow}^{\dagger}(0) + \sum_{kq} \phi_{kq} a_{\downarrow}^{\dagger}(q) a_{\uparrow}^{\dagger}(k) a_{\uparrow}(k+q) \right. \\
&\quad + \sum_{kqpl} \phi_{kqplm} a_{\downarrow}^{\dagger}(q) a_{\uparrow}^{\dagger}(k) a_{\uparrow}^{\dagger}(p) a_{\uparrow}(l) a_{\uparrow}(k+q+p-l) \\
&\quad \left. + \dots \right] |\mathbf{FS}_{\uparrow}\rangle
\end{aligned}$$