$$\begin{array}{c|cccc}
f(\mathbf{r}, \mathbf{\Omega}) & \hat{f}(\mathbf{k}, \mathbf{\Omega}) & \hat{f}(\mathbf{k}, \mathbf{\omega}_{k}) & f(\mathbf{r}, \mathbf{\Omega}) & \hat{f}(\mathbf{k}, \mathbf{\Omega}) \\
\downarrow & & & & & & & & & & & \\
f_{m'\mu}^{m}(\mathbf{r}) & & \hat{f}_{m'\mu}^{m}(\mathbf{k}) & & \hat{f}_{m'\mu}^{m}(\mathbf{k}) & & f(\mathbf{r}, \omega_{r}) & \hat{f}(\mathbf{k}, \omega_{k})
\end{array}$$
(a)
(b)
(c)