

$$\begin{aligned}
f_1(x_1, x_2) \propto & e^{i(q_2 - q_1)(x_1 - x_2)} \theta(-x_1 + x_2) e^{iq_2(x_2 - ct)} \theta(ct - x_2) \\
& + e^{-i(q_2 - q_1)(x_1 + x_2)} \theta(x_1 + x_2) e^{iq_2(x_2 - ct)} \theta(ct - x_2) \\
& + e^{i(q_2 - q_1)(x_1 - ct)} \theta(ct - x_1) e^{iq_1(x_2 - ct)} \theta(ct - x_2) \\
& + e^{-i(q_2 - q_1)(x_1 + ct)} \theta(x_1 + ct) e^{iq_1(x_2 - ct)} \theta(ct - x_2)
\end{aligned} \tag{1}$$