

Solution to Problem Sheet 4

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Solve for problem no. 1

(a)

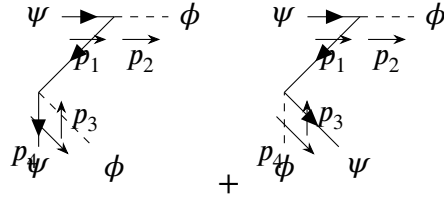


Figure 1: Feynman diagram for $\psi\phi \rightarrow \psi\phi$.

Scattering amplitude for this diagram is

$$\begin{aligned} i\mathcal{M} &= \int \frac{d^4k}{(2\pi)^4} \delta^4(p_1 - p_2 - k) \delta^4(p_3 - p_4 - k) \frac{i(2\pi)^8}{k^2 - M^2 + i\epsilon} \\ &= (ig)^2 i(2\pi)^4 \delta^4(p_3 + p_4 - p_1 - p_2) \frac{1}{(p_1 + p_2)^2 - M^2 + i\epsilon} \end{aligned}$$

(b)

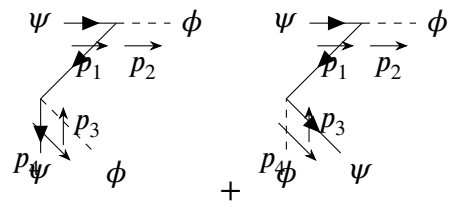


Figure 2: Feynman diagram for $\psi\psi^\dagger \rightarrow \phi\phi$.