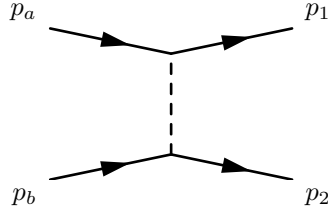


$$\begin{aligned}
\langle f | S - 1 | i \rangle &= \frac{(-ig)^2}{2(2\pi)^6} \int \frac{d^4 k}{(2\pi)^4} \frac{i}{k^2 - m^2 + i\epsilon} \int d^4 x_1 d^4 x_2 \left\{ e^{i(p_1 + k - p_a)x_1} e^{i(p_2 - k - p_b)x_2} \right. \\
&\quad + e^{i(p_2 + k - p_a)x_1} e^{i(p_1 - k - p_b)x_2} + e^{i(p_1 + k - p_b)x_1} e^{i(p_2 - k - p_1)x_2} \\
&\quad \left. + e^{i(p_2 + k - p_b)x_1} e^{i(p_1 - k - p_a)x_2} \right\} \\
&= \frac{i(-ig)^2}{(2\pi)^6} \int \frac{(2\pi)^4 d^4 k}{k^2 - m^2 + i\epsilon} \left\{ \delta^4(p_1 + k - p_a) \delta^4(p_2 - k - p_b) \right. \\
&\quad \left. + \delta^4(p_2 + k - p_a) \delta^4(p_1 - k - p_b) \right\} \\
&= \frac{i(-ig)^2}{(2\pi)^6} \left\{ \frac{1}{(p_1 - p_a)^2 - m^2} + \frac{1}{(p_2 - p_a)^2 - m^2} \right\} \\
&\quad \times (2\pi)^4 \delta^4(p_1 + p_2 - p_a - p_b) \\
&= \text{Diagram 1} + \text{Diagram 2} \tag{1}
\end{aligned}$$


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