

$$S = \int \int \int \int (\alpha_2 h_{\alpha\beta} h^{\alpha\beta} - \alpha_3 h^\alpha_\alpha h^\beta_\beta + h^{\alpha\beta} \mathcal{T}_{\alpha\beta} + \frac{1}{2} \alpha_1 (\partial_\beta h^\chi_\chi \partial^\beta h^\alpha_\alpha + 2 \partial_\alpha h^{\alpha\beta} \partial_\chi h^\chi_\beta - 2 \partial^\beta h^\alpha_\alpha \partial_\chi h^\chi_\beta - \partial_\chi h_{\alpha\beta} \partial^\chi h^{\alpha\beta})) [t, x, y, z] dz dy dx dt$$
$$\begin{array}{c}
\begin{array}{cc}
0^+ h^\perp & 0^+ h^\parallel \\
0^+ h^\perp \dagger & \begin{array}{c} \alpha_2 - \alpha_3 \quad -\sqrt{3} \alpha_3 \\ -\sqrt{3} \alpha_3 \quad \alpha_2 - 3\alpha_3 + \alpha_1 k^2 \end{array} \\
0^+ h^\parallel \dagger & 1^- h^\perp_\alpha
\end{array} \\
\begin{array}{cc}
1^- h^\perp \dagger^\alpha & \begin{array}{c} \alpha_2 \\ 2 \end{array} \\
2^+ h^\parallel \dagger^{\alpha\beta} & \begin{array}{c} 2^+ h^\parallel_{\alpha\beta} \\ \alpha_2 - \frac{\alpha_1 k^2}{2} \end{array}
\end{array}
\end{array}$$

	$0^{\cdot}\mathcal{T}^{\perp}$	$0^{\cdot}\mathcal{T}^{\parallel}$	
$0^{\cdot}\mathcal{T}^{\perp} +$	$\frac{1}{\alpha_2 + \alpha_3 (-1 - \frac{3\alpha_3}{2\alpha_3 + \alpha_1 k^2})}$	$\frac{\sqrt{3}\alpha_3}{\alpha_2(\alpha_2 - 4\alpha_3) + \alpha_1(\alpha_2 - \alpha_3)k^2}$	
$0^{\cdot}\mathcal{T}^{\parallel} +$	$\frac{\sqrt{3}\alpha_3}{\alpha_2(\alpha_2 - 4\alpha_3) + \alpha_1(\alpha_2 - \alpha_3)k^2}$	$\frac{1}{\frac{\alpha_2(\alpha_2 - 4\alpha_3)}{2\alpha_2 - \alpha_3} + \alpha_1 k^2}$	
		$1^{\cdot}\mathcal{T}^{\perp}_{\alpha}$	
	$1^{\cdot}\mathcal{T}^{\perp} \uparrow^{\alpha}$	$\frac{1}{\alpha_2}$	$2^{\cdot}\mathcal{T}^{\parallel}_{\alpha\beta}$
		$2^{\cdot}\mathcal{T}^{\parallel} \uparrow^{\alpha\beta}$	$\frac{1}{\alpha_2 - \frac{\alpha_1 k^2}{2}}$

(No source constraints)

Two Feynman diagrams illustrating the exchange of a Pion ( $P$ ) meson between two nucleons ( $N$ ).

The left diagram shows the exchange of a Pion with  $J^P = 0^+$  via a dashed line. The momentum transfer is  $k^\mu = (\mathcal{E}, 0, 0, p)$ .

The right diagram shows the exchange of a Pion with  $J^P = 2^+$  via a wavy line. The momentum transfer is  $k^\mu = (\mathcal{E}, 0, 0, p)$ .

Pole residue:	$\frac{\alpha_{\frac{1}{2}}^2 - 2\alpha_{\frac{2}{3}}\alpha_{\frac{4}{3}} + 4\alpha_{\frac{2}{3}}^2}{\alpha_{\frac{1}{2}}(\alpha_{\frac{2}{3}} - \alpha_{\frac{4}{3}})^2} > 0$
Square mass:	$-\frac{\alpha_{\frac{2}{2}}(\alpha_{\frac{4}{3}} - \alpha_{\frac{2}{3}})}{\alpha_{\frac{1}{2}}(\alpha_{\frac{2}{3}} - \alpha_{\frac{4}{3}})} > 0$
Spin:	0
Parity:	Even

Pole residue:	$-\frac{2}{\alpha_1} > 0$
Square mass:	$\frac{2\alpha_1}{\alpha_1^2} > 0$
Spin:	2
Parity:	Even

(No particles)

(Demonstrably impossible)