

[illegible]

| | $\omega_0^{\#1}$ | $f_0^{\#1}$ | $f_0^{\#2}$ | $\omega_0^{\#1}$ |
|--------------------------|--|---|-------------|---|
| $\omega_0^{\#1} \dagger$ | $\frac{\alpha_0}{2} + \beta_2 + (\alpha_4 + \alpha_6) k^2$ | $-\frac{i(\alpha_0+2\beta_2)k}{\sqrt{2}}$ | 0 | 0 |
| $f_0^{\#1} \dagger$ | $\frac{i(\alpha_0+2\beta_2)k}{\sqrt{2}}$ | $2\beta_2 k^2$ | 0 | 0 |
| $f_0^{\#2} \dagger$ | 0 | 0 | 0 | 0 |
| $\omega_0^{\#1} \dagger$ | 0 | 0 | 0 | $\frac{\alpha_0}{2} + 4\beta_3 + (\alpha_2 + \alpha_3) k^2$ |

| Source constraints | # |
|--|----|
| SO(3) irreps | 1 |
| $\tau_0^{\#2} == 0$ | 1 |
| $\tau_1^{\#2\alpha} + 2 i k \tau_1^{\#2\alpha} == 0$ | 3 |
| $\tau_1^{\#1\alpha} == 0$ | 3 |
| $\tau_{1+}^{\#1\alpha\beta} + i k \tau_{1+}^{\#2\alpha\beta} == 0$ | 3 |
| Total #: | 10 |

| | $\sigma_2^{\#1} \uparrow \alpha\beta$ | $\tau_2^{\#1} \uparrow \alpha\beta$ | $\sigma_2^{\#1} \uparrow \alpha\beta\chi$ |
|---|---|--|---|
| $\sigma_2^{\#1} \uparrow \alpha\beta$ | $\frac{16\beta_1}{-\alpha_0^2+4\alpha_0\beta_1+16(\alpha_1+\alpha_4)\beta_1k^2}$ | $\frac{2i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k-16(\alpha_1+\alpha_4)\beta_1k^3}$ | 0 |
| $\tau_2^{\#1} \uparrow \alpha\beta$ | $-\frac{2i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k-16(\alpha_1+\alpha_4)\beta_1k^3}$ | $\frac{2(\alpha_0-4(\beta_1+(\alpha_1+\alpha_4)k^2))}{k^2(\alpha_0^2-4\alpha_0\beta_1-16(\alpha_1+\alpha_4)\beta_1k^2)}$ | 0 |
| $\sigma_2^{\#1} \uparrow \alpha\beta\chi$ | 0 | 0 | $\frac{1}{\frac{\alpha_0}{4}+\beta_1+(\alpha_1+\alpha_2)k^2}$ |

The diagram shows two vertices (pink circles) connected by a horizontal dashed line representing a massive particle. The left vertex has two incoming lines (black and blue) and one outgoing line (black). The right vertex has one incoming line (black) and two outgoing lines (black and blue). The dashed line is labeled with $J^P = 0^-$ above it and \vec{k}, m below it. To the right of the diagram is a table summarizing the properties of the exchanged particle.

| Massive particle | |
|------------------|--|
| Pole residue: | $-\frac{1}{a_2 + a_3} > 0$ |
| Polarisations: | 1 |
| Square mass: | $\frac{-a_0 + 8\beta_3}{2(a_2 + a_3)} > 0$ |
| Spin: | 0 |
| Parity: | Odd |

The diagram shows two vertices connected by a wavy line representing a massive particle. The left vertex has three external lines (two solid, one dashed) and is labeled $J^P = 2^-$. The right vertex has two external lines (one solid, one dashed). The wavy line is labeled k, μ .

| Massive particle | |
|------------------|--|
| Pole residue: | $-\frac{1}{\alpha_1 + \alpha_2} > 0$ |
| Polarisations: | 5 |
| Square mass: | $\frac{\alpha_0 - 4\beta_1}{4(\alpha_1 + \alpha_2)} > 0$ |
| Spin: | 2 |
| Parity: | Odd |

| Quadratic pole | |
|----------------|--------------------------|
| Pole residue: | $\frac{1}{\alpha_0} > 0$ |
| Polarisations: | 2 |

The diagram shows a particle interaction with two incoming particles (circles) and two outgoing particles (circles). A wavy line connects the two interaction vertices, labeled with k^μ . The overall quantum numbers are given as $J^P = 1^-$.

Massive particle

| | |
|----------------|--|
| Pole residue: | $\frac{1}{a_0} + \frac{\alpha_4 + \alpha_6 + 2\beta_2}{2\alpha_4\beta_1 + 2\alpha_6\beta_2} > 0$ |
| Polarisations: | 1 |
| Square mass: | $\frac{a_0(\alpha_0 + 2\beta_2)}{4(\alpha_4 + \alpha_6)\beta_2} > 0$ |
| Spin: | 0 |
| Parity: | Even |