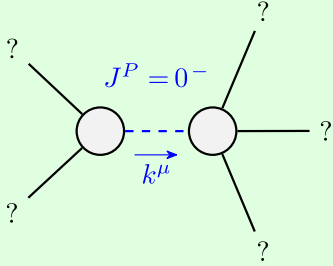


Lagrangian density

$$-\frac{1}{3}t_1\omega_{\kappa\alpha}\omega_{\kappa\alpha}^{\prime}-\frac{1}{3}t_1\omega_{\kappa\lambda}\omega_{\kappa\lambda}^{\prime}+\frac{2}{3}t_2\omega_{\kappa\lambda}\omega_{\kappa\lambda}^{\prime}+\frac{1}{3}t_1\omega_{\kappa\lambda}^{\prime}\omega_{\kappa\lambda}^{\kappa\lambda}+\frac{1}{3}t_2\omega_{\kappa\lambda}^{\prime}\omega_{\kappa\lambda}^{\kappa\lambda}+\frac{2}{3}r_2\partial^{\beta}\omega_{\kappa}^{\alpha}\partial_{\theta}\omega_{\alpha\beta}^{\kappa}-\frac{1}{3}r_2\partial_{\theta}\omega_{\alpha\beta}^{\kappa}\partial_{\kappa}\omega^{\alpha\beta\theta}-\frac{2}{3}r_2\partial_{\theta}\omega_{\alpha\beta}^{\kappa}\partial_{\kappa}\omega^{\theta\alpha\beta}-\frac{1}{3}t_1\partial^{\alpha}f_{\theta\kappa}\partial^{\kappa}f_{\alpha}^{\theta}-\frac{1}{3}t_1\partial^{\alpha}f_{\theta\kappa}\partial^{\kappa}f_{\alpha}^{\theta}+\frac{1}{6}t_2\partial^{\alpha}f_{\kappa\theta}\partial^{\kappa}f_{\alpha}^{\theta}-\frac{1}{6}t_2\partial^{\alpha}f_{\kappa\theta}\partial^{\kappa}f_{\alpha}^{\theta}-\frac{1}{3}t_1\omega_{\kappa\alpha}^{\alpha}\partial^{\kappa}f_{\prime}^{\prime}+\frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^{\kappa}f_{\prime}^{\prime}+\frac{2}{3}t_1\partial^{\alpha}f_{\kappa\alpha}\partial^{\kappa}f_{\prime}^{\prime}-\frac{1}{3}t_1\partial_{\kappa}f_{\lambda}^{\lambda}\partial^{\kappa}f_{\prime}^{\prime}+\frac{1}{3}t_1\omega_{\iota\theta\kappa}\partial^{\kappa}f^{\iota\theta}+\frac{1}{3}t_2\omega_{\iota\theta\kappa}\partial^{\kappa}f^{\iota\theta}+\frac{4}{3}t_1\omega_{\iota\kappa\theta}\partial^{\kappa}f^{\iota\theta}-\frac{2}{3}t_2\omega_{\iota\kappa\theta}\partial^{\kappa}f^{\iota\theta}-\frac{1}{3}t_1\omega_{\theta\iota\kappa}\partial^{\kappa}f^{\iota\theta}-\frac{1}{3}t_2\omega_{\theta\iota\kappa}\partial^{\kappa}f^{\iota\theta}+\frac{2}{3}t_1\omega_{\theta\kappa\iota}\partial^{\kappa}f^{\iota\theta}+\frac{2}{3}t_2\omega_{\theta\kappa\iota}\partial^{\kappa}f^{\iota\theta}-\frac{1}{3}t_1\omega_{\iota\alpha}^{\alpha}\partial^{\kappa}f_{\prime}^{\prime}-\frac{1}{3}t_1\omega_{\iota\lambda}^{\lambda}\partial^{\kappa}f_{\prime}^{\prime}+\frac{1}{3}t_1\partial^{\alpha}f_{\kappa}^{\lambda}\partial^{\kappa}f_{\lambda\alpha}^{\prime}-\frac{1}{6}t_2\partial^{\alpha}f_{\kappa}^{\lambda}\partial^{\kappa}f_{\lambda\alpha}^{\prime}+\frac{1}{3}t_1\partial_{\kappa}f_{\theta}^{\lambda}\partial^{\kappa}f_{\lambda}^{\theta}+\frac{2}{3}t_1\partial_{\kappa}f_{\theta}^{\lambda}\partial^{\kappa}f_{\lambda}^{\theta}+\frac{1}{6}t_2\partial_{\kappa}f_{\theta}^{\lambda}\partial^{\kappa}f_{\lambda}^{\theta}-\frac{1}{3}t_1\partial^{\alpha}f_{\lambda}^{\alpha}\partial^{\kappa}f_{\alpha}^{\lambda}+\frac{1}{3}r_2\partial_{\kappa}\omega^{\alpha\beta}\partial^{\kappa}\omega_{\alpha\beta\theta}-\frac{2}{3}r_2\partial^{\beta}\omega_{\alpha\beta}^{\prime}\partial_{\lambda}\omega_{\alpha\beta}^{\prime}+\frac{2}{3}r_2\partial^{\beta}\omega_{\alpha\beta}^{\prime}\partial_{\lambda}\omega_{\alpha\beta}^{\prime}$$

Added source term:  $f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}$

| $\sigma_{1+}^{\#1}+\alpha\beta$ | $\sigma_{1+}^{\#2}+\alpha\beta$                | $\tau_{1+}^{\#1}+\alpha\beta$               | $\sigma_{1-}^{\#1}+\alpha$        | $\sigma_{1-}^{\#2}+\alpha$            | $\tau_{1-}^{\#1}+\alpha$ | $\tau_{1-}^{\#2}+\alpha$             |
|---------------------------------|--|---|-----------------------------------|---------------------------------------|--------------------------|--------------------------------------|
| $\sigma_{1+}^{\#1}+\alpha\beta$ | $\frac{2(t_1+t_2)}{3t_1t_2}$                   | $\frac{\sqrt{2}(t_1-2t_2)}{3(1+k^2)t_1t_2}$ | 0                                 | 0                                     | 0                        | 0                                    |
| $\sigma_{1+}^{\#2}+\alpha\beta$ | $\frac{\sqrt{2}(t_1-2t_2)}{3(1+k^2)t_1t_2}$    | $\frac{t_1+4t_2}{3(1+k^2)^2t_1t_2}$         | 0                                 | 0                                     | 0                        | 0                                    |
| $\tau_{1+}^{\#1}+\alpha\beta$   | $-\frac{i\sqrt{2}k(t_1-2t_2)}{3(1+k^2)t_1t_2}$ | $-\frac{ik(t_1+4t_2)}{3(1+k^2)^2t_1t_2}$    | 0                                 | 0                                     | 0                        | 0                                    |
| $\sigma_{1-}^{\#1}+\alpha$      | 0  | 0   | $\frac{6}{(3+4k^2)^2t_1}$         | $\frac{6\sqrt{2}}{(3+4k^2)^2t_1}$     | 0                        | $\frac{12ik}{(3+4k^2)^2t_1}$         |
| $\sigma_{1-}^{\#2}+\alpha$      | 0  | 0   | $\frac{6\sqrt{2}}{(3+4k^2)^2t_1}$ | $\frac{12}{(3+4k^2)^2t_1}$            | 0                        | $\frac{12i\sqrt{2}k}{(3+4k^2)^2t_1}$ |
| $\tau_{1-}^{\#1}+\alpha$        | 0  | 0   | 0                                 | 0                                     | 0                        | 0                                    |
| $\tau_{1-}^{\#2}+\alpha$        | 0  | 0   | $-\frac{12ik}{(3+4k^2)^2t_1}$     | $-\frac{12i\sqrt{2}k}{(3+4k^2)^2t_1}$ | 0                        | $\frac{24k^2}{(3+4k^2)^2t_1}$        |



| Massive particle |                            |
|------------------|----------------------------|
| Pole residue:    | $-\frac{1}{r_2} \succ 0$   |
| Polarisations:   | 1                          |
| Square mass:     | $-\frac{t_2}{r_2} \succ 0$ |
| Spin:            | 0                          |
| Parity:          | Odd                        |

$r_2 < 0 \ \&\& \ t_2 > 0$

(No massless particles)

| $\omega_{1+}^{\#1}+\alpha\beta$ | $\omega_{1+}^{\#2}+\alpha\beta$  | $f_{1+}^{\#1}+\alpha\beta$         | $\omega_{1-}^{\#1}+\alpha$ | $\omega_{1-}^{\#2}+\alpha$        | $f_{1-}^{\#1}+\alpha$ | $f_{1-}^{\#2}+\alpha$            |
|---------------------------------|----------------------------------|------------------------------------|----------------------------|-----------------------------------|-----------------------|----------------------------------|
| $\omega_{1+}^{\#1}+\alpha\beta$ | $\frac{1}{6}(t_1+4t_2)$          | $-\frac{i k(t_1-2t_2)}{3\sqrt{2}}$ | 0                          | 0                                 | 0                     | 0                                |
| $\omega_{1+}^{\#2}+\alpha\beta$ | $-\frac{t_1-2t_2}{3\sqrt{2}}$    | $\frac{1}{3}\bar{ik}(t_1+t_2)$     | 0                          | 0                                 | 0                     | 0                                |
| $f_{1+}^{\#1}+\alpha\beta$      | $\frac{ik(t_1-2t_2)}{3\sqrt{2}}$ | $-\frac{1}{3}k^2(t_1+t_2)$         | 0                          | 0                                 | 0                     | 0                                |
| $\omega_{1-}^{\#1}+\alpha$      | 0                                | 0                                  | $\frac{t_1}{6}$            | $\frac{t_1}{3\sqrt{2}}$           | 0                     | $\frac{ikt_1}{3}$                |
| $\omega_{1-}^{\#2}+\alpha$      | 0                                | 0                                  | $\frac{t_1}{3\sqrt{2}}$    | $\frac{t_1}{3}$                   | 0                     | $\frac{1}{3}\bar{i}\sqrt{2}kt_1$ |
| $f_{1-}^{\#1}+\alpha$           | 0                                | 0                                  | 0                          | 0                                 | 0                     | 0                                |
| $f_{1-}^{\#2}+\alpha$           | 0                                | 0                                  | $-\frac{1}{3}\bar{ik}kt_1$ | $-\frac{1}{3}\bar{i}\sqrt{2}kt_1$ | 0                     | $\frac{2k^2t_1}{3}$              |

Source constraints

| SO(3) irreps  | #  |
|---|----|
| $\tau_{0+}^{\#2}==0$  | 1  |
| $\tau_{0+}^{\#1}==0$  | 1  |
| $\sigma_{0+}^{\#1}==0$  | 1  |
| $\tau_{1-}^{\#2\alpha}+2\bar{ik}\sigma_{1-}^{\#1\alpha}==0$           | 3  |
| $\tau_{1-}^{\#1\alpha}==0$  | 3  |
| $\sigma_{1-}^{\#1\alpha}==\sigma_{1-}^{\#2\alpha}$                    | 3  |
| $\tau_{1+}^{\#1\alpha\beta}+\bar{ik}\sigma_{1+}^{\#2\alpha\beta}==0$  | 3  |
| $\tau_{2+}^{\#1\alpha\beta}-2\bar{ik}\sigma_{2+}^{\#1\alpha\beta}==0$ | 5  |
| Total #:  | 20 |

| $\sigma_{0+}^{\#1}+$ | $\tau_{0+}^{\#1}+$ | $\tau_{0+}^{\#2}+$ | $\sigma_{0-}^{\#1}+$   |
|----------------------|--------------------|--------------------|------------------------|
| $\sigma_{0+}^{\#1}+$ | 0                  | 0                  | 0                      |
| $\tau_{0+}^{\#1}+$   | 0                  | 0                  | 0                      |
| $\tau_{0+}^{\#2}+$   | 0                  | 0                  | 0                      |
| $\sigma_{0-}^{\#1}+$ | 0                  | 0                  | $\frac{1}{k^2r_2+t_2}$ |

| $\omega_{2+}^{\#1}+\alpha\beta$     | $f_{2+}^{\#1}+\alpha\beta$ | $\omega_{2-}^{\#1}+\alpha\beta\chi$ |
|-------------------------------------|----------------------------|-------------------------------------|
| $\omega_{2+}^{\#1}+\alpha\beta$     | $\frac{t_1}{2}$            | $-\frac{ik t_1}{\sqrt{2}}$          |
| $f_{2+}^{\#1}+\alpha\beta$          | $\frac{ikt_1}{\sqrt{2}}$   | $k^2t_1$                            |
| $\omega_{2-}^{\#1}+\alpha\beta\chi$ | 0                          | $\frac{t_1}{2}$                     |

| $\omega_{0+}^{\#1}+$ | $f_{0+}^{\#1}+$ | $f_{0+}^{\#2}+$ | $\omega_{0-}^{\#1}+$ |
|----------------------|-----------------|-----------------|----------------------|
| $\omega_{0+}^{\#1}+$ | 0               | 0               | 0                    |
| $f_{0+}^{\#1}+$      | 0               | 0               | 0                    |
| $f_{0+}^{\#2}+$      | 0               | 0               | 0                    |
| $\omega_{0-}^{\#1}+$ | 0               | 0               | $k^2r_2+t_2$         |

| $\sigma_{2+}^{\#1}+\alpha\beta$     | $\tau_{2+}^{\#1}+\alpha\beta$        | $\sigma_{2-}^{\#1}+\alpha\beta\chi$ |
|-------------------------------------|--------------------------------------|-------------------------------------|
| $\sigma_{2+}^{\#1}+\alpha\beta$     | $-\frac{2i\sqrt{2}k}{(1+2k^2)^2t_1}$ | 0                                   |
| $\tau_{2+}^{\#1}+\alpha\beta$       | $\frac{2i\sqrt{2}k}{(1+2k^2)^2t_1}$  | $\frac{4k^2}{(1+2k^2)^2t_1}$        |
| $\sigma_{2-}^{\#1}+\alpha\beta\chi$ | 0                                    | $\frac{2}{t_1}$                     |