

Source constraints	#
SO(3) irreps	
$\sigma_0^{\#1} == 0$	1
$\tau_0^{\#2} == 0$	1
$\tau_0^{\#1} - 2i k \sigma_0^{\#1} == 0$	1
$\tau_1^{\#2 \alpha} + 2i k \sigma_1^{\#2 \alpha} == 0$	3
$\tau_1^{\#1 \alpha} == 0$	3
$\tau_1^{\#1 \alpha \beta} + i k \sigma_1^{\#2 \alpha \beta} == 0$	3
$\tau_2^{\#1 \alpha \beta} - 2i k \sigma_2^{\#1 \alpha \beta} == 0$	5
Total #:	17

$\omega_0^{\#1} +$	$f_0^{\#1}$	$f_0^{\#2}$	$\omega_0^{\#1}$
$\omega_0^{\#1} +$	$-t_1$	$i\sqrt{2} k t_1$	0
$f_0^{\#1} +$	$-i\sqrt{2} k t_1$	$-2k^2 t_1$	0
$f_0^{\#2} +$	0	0	0
$\omega_0^{\#1} +$	0	0	0

$\sigma_0^{\#1} +$	$\tau_0^{\#1}$	$\tau_0^{\#2}$	$\sigma_0^{\#1}$
$\sigma_0^{\#1} +$	$-\frac{1}{(1+2k^2)^2 t_1}$	$\frac{i\sqrt{2} k}{(1+2k^2)^2 t_1}$	0
$\tau_0^{\#1} +$	$-\frac{i\sqrt{2} k}{(1+2k^2)^2 t_1}$	$-\frac{2k^2}{(1+2k^2)^2 t_1}$	0
$\tau_0^{\#2} +$	0	0	0
$\sigma_0^{\#1} +$	0	0	0

$\omega_2^{\#1} + \alpha\beta$	$f_2^{\#1} + \alpha\beta$	$\omega_2^{\#1}$
$\omega_2^{\#1} + \alpha\beta$	$\frac{t_1}{2}$	$-\frac{ik t_1}{\sqrt{2}}$
$f_2^{\#1} + \alpha\beta$	$\frac{ik t_1}{\sqrt{2}}$	$k^2 t_1$
$\omega_2^{\#1} + \alpha\beta x$	0	$k^2 r_1 + \frac{t_1}{2}$

$\sigma_2^{\#1} + \alpha\beta$	$\tau_2^{\#1}$	$\sigma_2^{\#1}$
$\sigma_2^{\#1} + \alpha\beta$	$\frac{2}{(1+2k^2)^2 t_1}$	$-\frac{2i\sqrt{2} k}{(1+2k^2)^2 t_1}$
$\tau_2^{\#1} + \alpha\beta$	$\frac{2i\sqrt{2} k}{(1+2k^2)^2 t_1}$	$\frac{4k^2}{(1+2k^2)^2 t_1}$
$\sigma_2^{\#1} + \alpha\beta x$	0	$\frac{2}{2k^2 r_1 + t_1}$

Lagrangian density

$$\begin{aligned}
& -t_1 \omega_{\kappa\alpha}^{\prime\prime} \omega_{\kappa\alpha}^{\prime} - \frac{1}{3} t_1 \omega_{\kappa\lambda}^{\prime} \omega_{\kappa\lambda}^{\prime} + \frac{1}{3} t_1 \omega_{\kappa\lambda}^{\prime} \omega_{\kappa\lambda}^{\prime} - r_5 \partial_{\lambda} \omega_{\kappa\lambda}^{\prime} \partial^{\lambda} \omega_{\lambda}^{\alpha} - \\
& \frac{2}{3} r_1 \partial^{\beta} \omega_{\kappa\alpha\beta}^{\theta} \omega_{\kappa\alpha\beta}^{\theta} - \frac{2}{3} r_1 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\alpha\beta\theta} + \frac{2}{3} r_1 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\theta\alpha\beta} - \\
& r_5 \partial_{\alpha} \omega_{\lambda\theta}^{\alpha} \partial_{\kappa} \omega^{\theta\kappa\lambda} + r_5 \partial_{\theta} \omega_{\lambda\alpha}^{\alpha} \partial_{\kappa} \omega^{\theta\kappa\lambda} - r_5 \partial_{\alpha} \omega_{\lambda\theta}^{\alpha} \partial_{\kappa} \omega^{\theta\kappa\lambda} + \\
& 2 r_5 \partial_{\theta} \omega_{\lambda\alpha}^{\alpha} \partial_{\kappa} \omega^{\theta\kappa\lambda} - \frac{1}{3} t_1 \partial^{\alpha} f_{\theta\kappa} \partial^{\kappa} f_{\alpha}^{\theta} - \frac{2}{3} t_1 \partial^{\alpha} f_{\theta\kappa} \partial^{\kappa} f_{\alpha}^{\theta} - \\
& \frac{1}{3} t_1 \partial^{\alpha} f_{\kappa}^{\alpha} \partial^{\kappa} f_{\alpha\lambda} + t_1 \omega_{\kappa\alpha}^{\alpha} \partial^{\kappa} f_{\lambda}^{\prime} + t_1 \omega_{\kappa\lambda}^{\lambda} \partial^{\kappa} f_{\lambda}^{\prime} + 2 t_1 \partial^{\alpha} f_{\kappa\alpha} \partial^{\kappa} f_{\lambda}^{\prime} - \\
& t_1 \partial_{\kappa} f_{\lambda}^{\lambda} \partial^{\kappa} f_{\lambda}^{\prime} + \frac{1}{3} t_1 \omega_{\lambda\theta\kappa} \partial^{\kappa} f^{\prime\theta} + \frac{4}{3} t_1 \omega_{\lambda\kappa\theta} \partial^{\kappa} f^{\prime\theta} - \frac{1}{3} t_1 \omega_{\theta\lambda\kappa} \partial^{\kappa} f^{\prime\theta} + \\
& \frac{2}{3} t_1 \omega_{\theta\kappa\lambda} \partial^{\kappa} f^{\prime\theta} - t_1 \omega_{\lambda\alpha}^{\alpha} \partial^{\kappa} f_{\kappa}^{\prime} - t_1 \omega_{\lambda\lambda}^{\lambda} \partial^{\kappa} f_{\kappa}^{\prime} + \frac{1}{3} t_1 \partial^{\alpha} f_{\kappa}^{\lambda} \partial^{\kappa} f_{\lambda\alpha} + \\
& \frac{1}{3} t_1 \partial_{\kappa} f_{\theta}^{\lambda} \partial^{\kappa} f_{\lambda}^{\theta} + \frac{2}{3} t_1 \partial_{\kappa} f_{\lambda}^{\theta} \partial^{\kappa} f_{\lambda}^{\theta} - t_1 \partial^{\alpha} f_{\lambda}^{\alpha} \partial^{\kappa} f_{\lambda\kappa} + \\
& \frac{2}{3} r_1 \partial_{\kappa} \omega^{\alpha\beta\theta} \partial^{\kappa} \omega_{\alpha\beta\theta} - \frac{2}{3} r_1 \partial_{\kappa} \omega^{\theta\alpha\beta} \partial^{\kappa} \omega_{\alpha\beta\theta} + \frac{2}{3} r_1 \partial^{\beta} \omega_{\lambda}^{\alpha\lambda} \partial_{\lambda} \omega_{\alpha\beta}^{\prime} - \\
& \frac{8}{3} r_1 \partial^{\beta} \omega_{\lambda}^{\lambda\alpha} \partial_{\lambda} \omega_{\alpha\beta}^{\prime} + r_5 \partial_{\alpha} \omega_{\lambda\theta}^{\alpha} \partial^{\lambda} \omega_{\kappa}^{\theta\kappa} - r_5 \partial_{\theta} \omega_{\lambda\alpha}^{\alpha} \partial^{\lambda} \omega_{\kappa}^{\theta\kappa}
\end{aligned}$$

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

	$\omega_{1+}^{\#1} \alpha\beta$	$\omega_{1+}^{\#2} \alpha\beta$	$f_{1+}^{\#1} \alpha\beta$	$\omega_{1-}^{\#1} \alpha$	$\omega_{1-}^{\#2} \alpha$	$f_{1-}^{\#1} \alpha$	$f_{1-}^{\#2} \alpha$
$\omega_{1+}^{\#1} + \alpha\beta$	$k^2 (2r_1 + r_5) + \frac{t_1}{6}$	$-\frac{t_1}{3\sqrt{2}}$	$-\frac{ik t_1}{3\sqrt{2}}$	0	0	0	0
$\omega_{1+}^{\#2} + \alpha\beta$	$-\frac{t_1}{3\sqrt{2}}$	$\frac{t_1}{3}$	$\frac{ik t_1}{3}$	0	0	0	0
$f_{1+}^{\#1} + \alpha\beta$	$\frac{ik t_1}{3\sqrt{2}}$	$-\frac{1}{3} i k t_1$	$\frac{k^2 t_1}{3}$	0	0	0	0
$\omega_{1-}^{\#1} + \alpha$	0	0	0	$k^2 (r_1 + r_5) - \frac{t_1}{2}$	$\frac{t_1}{\sqrt{2}}$	0	$i k t_1$
$\omega_{1-}^{\#2} + \alpha$	0	0	0	$\frac{t_1}{\sqrt{2}}$	0	0	0
$f_{1-}^{\#1} + \alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#2} + \alpha$	0	0	0	$-i k t_1$	0	0	0

$\sigma_{1+}^{\#1} + \alpha\beta$	$\sigma_{1+}^{\#2} \alpha\beta$	$\tau_{1+}^{\#1} \alpha\beta$	$\sigma_{1-}^{\#1} \alpha$	$\sigma_{1-}^{\#2} \alpha$	$\tau_{1-}^{\#1} \alpha$	$\tau_{1-}^{\#2} \alpha$
$\sigma_{1+}^{\#1} + \alpha\beta$	$\frac{1}{k^2 (2r_1 + r_5)}$	$\frac{1}{\sqrt{2} (k^2 + k^4) (2r_1 + r_5)}$	$\frac{i}{\sqrt{2} (k + k^3) (2r_1 + r_5)}$	0	0	0
$\sigma_{1+}^{\#2} + \alpha\beta$	$\frac{1}{\sqrt{2} (k^2 + k^4) (2r_1 + r_5)}$	$\frac{6k^2 (2r_1 + r_5) + t_1}{2 (k + k^3)^2 (2r_1 + r_5) t_1}$	$\frac{i (6k^2 (2r_1 + r_5) + t_1)}{2 (k (1 + k^2)^2 (2r_1 + r_5) t_1)}$	0	0	0
$\tau_{1+}^{\#1} + \alpha\beta$	$-\frac{i}{\sqrt{2} (k + k^3) (2r_1 + r_5)}$	$-\frac{i (6k^2 (2r_1 + r_5) + t_1)}{2 k (1 + k^2)^2 (2r_1 + r_5) t_1}$	$\frac{6k^2 (2r_1 + r_5) + t_1}{2 (1 + k^2)^2 (2r_1 + r_5) t_1}$	0	0	0
$\sigma_{1-}^{\#1} + \alpha$	0	0	0	$\frac{\sqrt{2}}{t_1 + 2k^2 t_1}$	0	$\frac{2i k}{t_1 + 2k^2 t_1}$
$\sigma_{1-}^{\#2} + \alpha$	0	0	0	$\frac{-2k^2 (r_1 + r_5) + t_1}{(t_1 + 2k^2 t_1)^2}$	0	$\frac{-i\sqrt{2} k (2k^2 (r_1 + r_5) - t_1)}{(t_1 + 2k^2 t_1)^2}$
$\tau_{1-}^{\#1} + \alpha$	0	0	0	0	0	0
$\tau_{1-}^{\#2} + \alpha$	0	0	0	0	0	$\frac{-4k^4 (r_1 + r_5) + 2k^2 t_1}{(t_1 + 2k^2 t_1)^2}$

Unitarity conditions

$r_1 < 0 \ \&\& \ r_5 > -2r_1 \ \&\& \ t_1 > 0$

Quadratic pole

Pole residue:  $\frac{1}{(2r_1 + r_5) t_1^2 p^2} > 0$

Polarisations: 2

Massive particle

Pole residue:  $-\frac{1}{r_1} > 0$

Polarisations: 5

Square mass:  $-\frac{t_1}{2r_1} > 0$

Spin: 2

Parity: Odd

