



Massive particle	
Pole residue:	$-\frac{1}{r_1} > 0$
Polarisations:	5
Square mass:	$-\frac{t_1}{2r_1} > 0$
Spin:	2
Parity:	Odd

### Unitarity conditions

$r_1 < 0 \ \&\& \ t_1 > 0$

(No massless particles)

### Lagrangian density

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

### Source constraints

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

$\omega_{1^{+}\alpha\beta}^{\#1}$	$\omega_{1^{+}\alpha\beta}^{\#2}$	$f_{1^{+}\alpha\beta}^{\#1}$	$\omega_{1^{-}\alpha}^{\#1}$	$\omega_{1^{-}\alpha}^{\#2}$	$f_{1^{-}\alpha}^{\#1}$	$f_{1^{-}\alpha}^{\#2}$
$\omega_{1^{+}}^{\#1} \dagger^{\alpha\beta} \frac{t_1}{6}$	$-\frac{t_1}{3\sqrt{2}}$	$-\frac{ikt_1}{3\sqrt{2}}$	0	0	0	0
$\omega_{1^{+}}^{\#2} \dagger^{\alpha\beta} -\frac{t_1}{3\sqrt{2}}$	$\frac{t_1}{3}$	$\frac{ikt_1}{3}$	0	0	0	0
$f_{1^{+}}^{\#1} \dagger^{\alpha\beta} \frac{ikt_1}{3\sqrt{2}}$	$-\frac{1}{3} i k t_1$	$\frac{k^2 t_1}{3}$	0	0	0	0
$\omega_{1^{-}}^{\#1} \dagger^{\alpha} 0$	0	0	$-k^2 r_1 - \frac{t_1}{2}$	$\frac{t_1}{\sqrt{2}}$	0	$i k t_1$
$\omega_{1^{-}}^{\#2} \dagger^{\alpha} 0$	0	0	$\frac{t_1}{\sqrt{2}}$	0	0	0
$f_{1^{-}}^{\#1} \dagger^{\alpha} 0$	0	0	0	0	0	0
$f_{1^{-}}^{\#2} \dagger^{\alpha} 0$	0	0	$-i k t_1$	0	0	0

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

$\sigma_{0^{+}}^{\#1} \dagger$	$\tau_{0^{+}}^{\#1}$	$\tau_{0^{+}}^{\#2}$	$\sigma_{0^{-}}^{\#1}$
$-\frac{1}{(1+2k^2)^2 t_1}$	$\frac{i \sqrt{2} k}{(1+2k^2)^2 t_1}$	0	0
$-\frac{i \sqrt{2} k}{(1+2k^2)^2 t_1}$	$-\frac{2 k^2}{(1+2k^2)^2 t_1}$	0	0
0	0	0	0
0	0	0	0

$\omega_{0^{+}}^{\#1}$	$f_{0^{+}}^{\#1}$	$f_{0^{+}}^{\#2}$	$\omega_{0^{-}}^{\#1}$
$-t_1$	$i \sqrt{2} k t_1$	0	0
$-i \sqrt{2} k t_1$	$-2 k^2 t_1$	0	0
0	0	0	0
0	0	0	0

$\omega_{2^{+}\alpha\beta}^{\#1}$	$f_{2^{+}\alpha\beta}^{\#1}$	$\omega_{2^{-}\alpha\beta\chi}^{\#1}$
$\frac{t_1}{2}$	$-\frac{i k t_1}{\sqrt{2}}$	0
$\frac{i k t_1}{\sqrt{2}}$	$k^2 t_1$	0
0	0	$k^2 r_1 + \frac{t_1}{2}$