

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

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

Unitarity conditions

(No massless particles)

Lagrangian density

$$\begin{aligned}
 &-\frac{1}{3}t_1\omega_{\prime}^{\alpha\prime}\omega_{\kappa\alpha}^{\kappa}\omega_{\prime}^{\kappa}t_1\omega_{\prime}^{\kappa\lambda}\omega_{\kappa\lambda}^{\prime}+r_1\partial_{\prime}\omega_{\kappa}^{\kappa\lambda}\partial_{\prime}\omega_{\lambda}^{\alpha}{}_{\alpha}{}^{\kappa}-\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_{\kappa}\omega^{\alpha\beta\theta}+\frac{2}{3}r_1\partial_{\theta}\omega_{\alpha\beta}^{\kappa}\partial_{\kappa}\omega^{\theta\alpha\beta}-3r_1\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial_{\theta}\omega^{\theta\kappa\lambda}+ \\
 &4r_3\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial_{\theta}\omega^{\theta\kappa\lambda}+3r_1\partial_{\theta}\omega_{\lambda}^{\alpha}\partial_{\kappa}\omega^{\theta\kappa\lambda}-4r_3\partial_{\theta}\omega_{\lambda}^{\alpha}\partial_{\kappa}\omega^{\theta\kappa\lambda}+ \\
 &r_1\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial_{\theta}\omega^{\kappa\lambda\theta}-2r_1\partial_{\theta}\omega_{\lambda}^{\alpha}\partial_{\kappa}\omega^{\kappa\lambda\theta}-\frac{1}{2}t_1\partial^{\alpha}f_{\theta\kappa}\partial^{\kappa}f_{\alpha}{}^{\theta}- \\
 &\frac{1}{2}t_1\partial^{\alpha}f_{\kappa\theta}\partial^{\kappa}f_{\alpha}{}^{\theta}-\frac{1}{2}t_1\partial^{\alpha}f_{\lambda}^{\lambda}\partial^{\kappa}f_{\alpha\lambda}{}^{\kappa}+\frac{1}{3}t_1\omega_{\kappa\alpha}^{\alpha}\partial^{\kappa}f_{\prime}{}_{\prime}{}^{\kappa}+ \\
 &\frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^{\kappa}f_{\prime}{}_{\prime}{}^{\kappa}+\frac{2}{3}t_1\partial^{\alpha}f_{\kappa\alpha}\partial^{\kappa}f_{\prime}{}_{\prime}{}^{\kappa}-\frac{1}{3}t_1\partial_{\kappa}f_{\lambda}^{\lambda}\partial^{\kappa}f_{\prime}{}_{\prime}{}^{\kappa}+2t_1\omega_{\prime\kappa\theta}\partial^{\kappa}f^{\prime\theta}- \\
 &\frac{1}{3}t_1\omega_{\prime\alpha}^{\alpha}\partial^{\kappa}f_{\kappa}{}^{\prime}-\frac{1}{3}t_1\omega_{\prime\lambda}^{\lambda}\partial^{\kappa}f_{\kappa}{}^{\prime}+\frac{1}{2}t_1\partial^{\alpha}f_{\lambda}^{\lambda}\partial^{\kappa}f_{\lambda\alpha}{}^{\kappa}+ \\
 &\frac{1}{2}t_1\partial_{\kappa}f_{\theta}^{\lambda}\partial^{\kappa}f_{\lambda}^{\theta}+\frac{1}{2}t_1\partial_{\kappa}f_{\theta}^{\lambda}\partial^{\kappa}f_{\lambda}^{\theta}-\frac{1}{3}t_1\partial^{\alpha}f_{\alpha}^{\lambda}\partial^{\kappa}f_{\lambda\kappa}{}^{\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_{\prime}^{\alpha\lambda}\partial_{\lambda}\omega_{\alpha\beta}{}_{\prime}{}^{\kappa}+ \\
 &\frac{4}{3}r_1\partial^{\beta}\omega_{\prime}^{\lambda\alpha}\partial_{\lambda}\omega_{\alpha\beta}{}_{\prime}{}^{\kappa}-4r_3\partial^{\beta}\omega_{\prime}^{\lambda\alpha}\partial_{\lambda}\omega_{\alpha\beta}{}_{\prime}{}^{\kappa}+3r_1\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\theta}^{\theta\kappa}- \\
 &4r_3\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\theta}^{\theta\kappa}-3r_1\partial_{\theta}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\alpha}^{\theta\kappa}+4r_3\partial_{\theta}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\alpha}^{\theta\kappa}
 \end{aligned}$$

Added source term:

$f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}$

	$\sigma_{1+}^{\#1}+\alpha\beta$	$\sigma_{1+}^{\#2}+\alpha\beta$	$\tau_{1+}^{\#1}+\alpha\beta$	$\sigma_{1-}^{\#1}+\alpha$	$\sigma_{1-}^{\#2}+\alpha$	$\tau_{1-}^{\#1}+\alpha$	$\tau_{1-}^{\#2}+\alpha$
$\sigma_{1+}^{\#1}+\alpha\beta$	0	$-\frac{\sqrt{2}}{t_1+k^2t_1}$	$-\frac{i\sqrt{2}k}{t_1+k^2t_1}$	0	0	0	0
$\sigma_{1+}^{\#2}+\alpha\beta$	$-\frac{\sqrt{2}}{t_1+k^2t_1}$	$\frac{-2k^2r_1+t_1}{(1+k^2)^2t_1^2}$	$-\frac{i(2k^3r_1-kt_1)}{(1+k^2)^2t_1^2}$	0	0	0	0
$\tau_{1+}^{\#1}+\alpha\beta$	$\frac{i\sqrt{2}k}{t_1+k^2t_1}$	$\frac{i(2k^3r_1-kt_1)}{(1+k^2)^2t_1^2}$	$\frac{-2k^4r_1+k^2t_1}{(1+k^2)^2t_1^2}$	0	0	0	0
$\sigma_{1-}^{\#1}+\alpha$	0	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	0	0	$\frac{12}{(3+4k^2)^2t_1}$	0	$\frac{12i\sqrt{2}k}{(3+4k^2)^2t_1}$
$\tau_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$\tau_{1-}^{\#2}+\alpha$	0	0	0	$-\frac{12ik}{(3+4k^2)^2t_1}$	$-\frac{12i\sqrt{2}k}{(3+4k^2)^2t_1}$	0	$\frac{24k^2}{(3+4k^2)^2t_1}$

	$\omega_{1+}^{\#1}+\alpha\beta$	$\omega_{1+}^{\#2}+\alpha\beta$	$f_{1+}^{\#1}+\alpha\beta$	$\omega_{1-}^{\#1}+\alpha$	$\omega_{1-}^{\#2}+\alpha$	$f_{1-}^{\#1}+\alpha$	$f_{1-}^{\#2}+\alpha$
$\omega_{1+}^{\#1}+\alpha\beta$	$k^2r_1-\frac{t_1}{2}$	$-\frac{t_1}{\sqrt{2}}$	$-\frac{ikt_1}{\sqrt{2}}$	0	0	0	0
$\omega_{1+}^{\#2}+\alpha\beta$	$-\frac{t_1}{\sqrt{2}}$	0	0	0	0	0	0
$f_{1+}^{\#1}+\alpha\beta$	$\frac{ikt_1}{\sqrt{2}}$	0	0	0	0	0	0
$\omega_{1-}^{\#1}+\alpha$	0	0	0	$\frac{t_1}{6}$	$\frac{t_1}{3\sqrt{2}}$	0	$\frac{ikt_1}{3}$
$\omega_{1-}^{\#2}+\alpha$	0	0	0	$\frac{t_1}{3\sqrt{2}}$	$\frac{t_1}{3}$	0	$\frac{1}{3}i\sqrt{2}kt_1$
$f_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#2}+\alpha$	0	0	0	$-\frac{1}{3}ikt_1$	$-\frac{1}{3}i\sqrt{2}kt_1$	0	$\frac{2k^2t_1}{3}$

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

Source constraints

SO(3) irreps	#
$\tau_{0+}^{\#2}==0$	1
$\tau_{0+}^{\#1}==0$	1
$\tau_{1-}^{\#2\alpha}+2ik\sigma_{1-}^{\#1\alpha}==0$	3
$\tau_{1-}^{\#1\alpha}==0$	3
$\sigma_{1-}^{\#1\alpha}==\sigma_{1-}^{\#2\alpha}$	3
$\tau_{1+}^{\#1\alpha\beta}+ik\sigma_{1+}^{\#2\alpha\beta}==0$	3
$\tau_{2+}^{\#1\alpha\beta}-2ik\sigma_{2+}^{\#1\alpha\beta}==0$	5
Total #:	19

	$\omega_{0+}^{\#1}+\alpha\beta$	$f_{0+}^{\#1}+\alpha\beta$	$f_{0+}^{\#2}+\alpha\beta$	$\omega_{0-}^{\#1}+\alpha$
$\omega_{0+}^{\#1}+\alpha\beta$	$6k^2(-r_1+r_3)$	0	0	0
$f_{0+}^{\#1}+\alpha\beta$	0	0	0	0
$f_{0+}^{\#2}+\alpha\beta$	0	0	0	0
$\omega_{0-}^{\#1}+\alpha$	0	0	0	$-t_1$

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

	$\sigma_{0+}^{\#1}+\alpha\beta$	$\tau_{0+}^{\#1}+\alpha\beta$	$\tau_{0+}^{\#2}+\alpha\beta$	$\sigma_{0-}^{\#1}+\alpha$
$\sigma_{0+}^{\#1}+\alpha\beta$	$\frac{1}{6k^2(-r_1+r_3)}$	0	0	0
$\tau_{0+}^{\#1}+\alpha\beta$	0	0	0	0
$\tau_{0+}^{\#2}+\alpha\beta$	0	0	0	0
$\sigma_{0-}^{\#1}+\alpha$	0	0	0	$-\frac{1}{t_1}$