



Massive particle

Pole residue:	$-\frac{1}{r_2} > 0$
Polarisations:	1
Square mass:	$\frac{t_1}{r_2} > 0$
Spin:	0
Parity:	Odd

(no massless particles)

$$r_2 < 0 \&\& t_1 < 0$$

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

Lagrangian density

$$\begin{aligned}
 &-t_1\omega_{\lambda'}^{\alpha'}\omega_{\kappa\alpha}^{\kappa}-t_1\omega_{\kappa\lambda}^{\kappa\lambda}\omega_{\lambda'}^{\lambda'}+f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}+\frac{2}{3}r_2\partial^\beta\omega^{\theta\alpha}_{\kappa}\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}{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_{\kappa}^{\lambda}\partial^\kappa f_{\alpha\lambda}+t_1\omega_{\kappa\alpha}^{\alpha}\partial^\kappa f_{\lambda'}^{\lambda'}+t_1\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{\lambda'}^{\lambda'}+2t_1\partial^\alpha f_{\kappa\alpha}\partial^\kappa f_{\lambda'}^{\lambda'}-\\
 &t_1\partial_\kappa f_{\lambda}^{\lambda}\partial^\kappa f_{\lambda'}^{\lambda'}+2t_1\omega_{\lambda\kappa\theta}\partial^\kappa f^{\lambda\theta}-t_1\omega_{\lambda\alpha}^{\alpha}\partial^\kappa f_{\kappa}^{\lambda'}-t_1\omega_{\lambda\lambda'}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda'}+\frac{1}{2}t_1\partial^\alpha f_{\kappa}^{\lambda}\partial^\kappa f_{\lambda\alpha}+\\
 &\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}-t_1\partial^\alpha f_{\alpha}^{\lambda}\partial^\kappa f_{\lambda\kappa}+\frac{1}{3}r_2\partial_\kappa\omega^{\alpha\beta\theta}\partial^\kappa\omega_{\alpha\beta\theta}+\\
 &\frac{2}{3}r_2\partial_\kappa\omega^{\theta\alpha\beta}\partial^\kappa\omega_{\alpha\beta\theta}-\frac{2}{3}r_2\partial^\beta\omega_{\lambda'}^{\alpha\lambda}\partial_\lambda\omega_{\alpha\beta}^{\lambda'}+\frac{2}{3}r_2\partial^\beta\omega_{\lambda'}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\lambda'}
 \end{aligned}$$

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

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

Source constraints

SO(3) irreps	#
$\tau_{0+}^{\#2} == 0$	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 #:	16

$\omega_{0+}^{\#1} \dagger$	$f_{0+}^{\#1}$	$f_{0+}^{\#2}$	$\omega_{0-}^{\#1}$
$\omega_{0+}^{\#1} \dagger$	$-t_1$	$i\sqrt{2}kt_1$	0
$f_{0+}^{\#1} \dagger$	$-i\sqrt{2}kt_1$	$-2k^2t_1$	0
$f_{0+}^{\#2} \dagger$	0	0	0
$\omega_{0-}^{\#1} \dagger$	0	0	$k^2r_2-t_1$

$\sigma_{0+}^{\#1} \dagger$	$\tau_{0+}^{\#1}$	$\tau_{0+}^{\#2}$	$\sigma_{0-}^{\#1}$
$\sigma_{0+}^{\#1} \dagger$	$-\frac{1}{(1+2k^2)^2}t_1$	$\frac{i\sqrt{2}k}{(1+2k^2)^2}t_1$	0
$\tau_{0+}^{\#1} \dagger$	$-\frac{i\sqrt{2}k}{(1+2k^2)^2}t_1$	$-\frac{2k^2}{(1+2k^2)^2}t_1$	0
$\tau_{0+}^{\#2} \dagger$	0	0	0
$\sigma_{0-}^{\#1} \dagger$	0	0	$\frac{1}{k^2r_2-t_1}$

$\omega_2^{\#1} + \alpha\beta$	$f_2^{\#1} \alpha\beta$	$\omega_2^{\#1} \omega_2^{\#1} \alpha\beta\chi$
$\frac{t_1}{2}$	$-\frac{ikt_1}{\sqrt{2}}$	0
$\frac{ikt_1}{\sqrt{2}}$	$k^2 t_1$	0
0	0	$\frac{t_1}{2}$