



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

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

(massless particles)

$\sigma_{1+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{1+}^{\#2}$	$\tau_{1+}^{\#1}$	$\sigma_{1-}^{\#1} \alpha$	$\sigma_{1-}^{\#2} \alpha$	$\tau_{1-}^{\#1} \alpha$	$\tau_{1-}^{\#2} \alpha$
$\frac{2}{3k^2 r_3}$	$-\frac{2\sqrt{2}}{3k^2 r_3 + 3k^4 r_3}$	$-\frac{2i\sqrt{2}}{3kr_3 + 3k^3 r_3}$	0	0	0	0
$-\frac{2\sqrt{2}}{3k^2 r_3 + 3k^4 r_3}$	$\frac{9k^2 r_3 + 4t_2}{3(k+k^3)^2 r_3 t_2}$	$\frac{i(9k^2 r_3 + 4t_2)}{3k(1+k^2)^2 r_3 t_2}$	0	0	0	0
$\frac{2i\sqrt{2}}{3kr_3 + 3k^3 r_3}$	$-\frac{i(9k^2 r_3 + 4t_2)}{3k(1+k^2)^2 r_3 t_2}$	$\frac{9k^2 r_3 + 4t_2}{3(1+k^2)^2 r_3 t_2}$	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Lagrangian density

$$\begin{aligned} &\frac{2}{3}t_2\omega_{\lambda'}^{\kappa\lambda}\omega_{\kappa\lambda'}^{\prime}+\frac{1}{3}t_2\omega_{\kappa\lambda'}^{\prime}\omega_{\kappa\lambda}^{\prime\prime}+f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}+ \\ &\frac{2}{3}r_2\partial^\beta\omega_{\kappa}^{\theta\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}+ \\ &r_3\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial_{\theta}\omega_{\theta}^{\theta\kappa\lambda}-r_3\partial_{\theta}\omega_{\lambda}^{\alpha}\partial_{\kappa}\omega_{\alpha}^{\theta\kappa\lambda}+\frac{1}{6}t_2\partial^{\alpha}f_{\theta\kappa}^{\alpha}\partial_{\kappa}f_{\alpha}^{\theta}-\frac{1}{6}t_2\partial^{\alpha}f_{\kappa\theta}^{\alpha}\partial_{\theta}f_{\alpha}^{\theta}+ \\ &\frac{1}{6}t_2\partial^{\alpha}f_{\kappa}^{\lambda}\partial_{\kappa}f_{\alpha\lambda}^{\lambda}+\frac{1}{3}t_2\omega_{\theta\kappa}\partial_{\kappa}f^{\prime\theta}-\frac{2}{3}t_2\omega_{\theta\kappa}\partial_{\kappa}f^{\prime\theta}-\frac{1}{3}t_2\omega_{\theta\kappa}\partial_{\kappa}f^{\prime\theta}+ \\ &\frac{2}{3}t_2\omega_{\theta\kappa\prime}\partial_{\kappa}f^{\prime\theta}-\frac{1}{6}t_2\partial^{\alpha}f_{\kappa}^{\lambda}\partial_{\kappa}f_{\lambda\alpha}^{\lambda}-\frac{1}{6}t_2\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}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_{\alpha\lambda'}^{\alpha\lambda}\partial_{\lambda}\omega_{\alpha\beta}^{\prime}+ \\ &\frac{2}{3}r_2\partial^{\beta}\omega_{\lambda'}^{\lambda\alpha}\partial_{\lambda}\omega_{\alpha\beta}^{\prime}-4r_3\partial^{\beta}\omega_{\lambda'}^{\lambda\alpha}\partial_{\lambda}\omega_{\alpha\beta}^{\prime}-r_3\partial_{\alpha}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\theta}^{\theta\kappa}+r_3\partial_{\theta}\omega_{\lambda}^{\alpha}\partial^{\lambda}\omega_{\alpha}^{\theta\kappa} \end{aligned}$$

$\omega_{1+}^{\#1} \dagger^{\alpha\beta}$	$\omega_{1+}^{\#2}$	$f_{1+}^{\#1}$	$\omega_{1-}^{\#1} \alpha$	$\omega_{1-}^{\#2} \alpha$	$f_{1-}^{\#1} \alpha$	$f_{1-}^{\#2} \alpha$
$\frac{1}{6}(9k^2 r_3 + 4t_2)$	$\frac{\sqrt{2}t_2}{3}$	$\frac{1}{3}i\sqrt{2}kt_2$	0	0	0	0
$\frac{\sqrt{2}t_2}{3}$	$\frac{t_2}{3}$	$\frac{ikt_2}{3}$	0	0	0	0
$-\frac{1}{3}i\sqrt{2}kt_2$	$-\frac{1}{3}ikt_2$	$\frac{k^2t_2}{3}$	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Source constraints	
SO(3) irreps	#
$\tau_{0+}^{\#2} == 0$	1
$\tau_{0+}^{\#1} == 0$	1
$\sigma_{0+}^{\#1} == 0$	1
$\tau_{1-}^{\#2\alpha} == 0$	3
$\tau_{1-}^{\#1\alpha} == 0$	3
$\sigma_{1-}^{\#2\alpha} == 0$	3
$\sigma_{1-}^{\#1\alpha} == 0$	3
$\tau_{1+}^{\#1\alpha\beta} + ik\sigma_{1+}^{\#2\alpha\beta} == 0$	3
$\sigma_{2-}^{\#1\alpha\beta\chi} == 0$	5
$\tau_{2+}^{\#1\alpha\beta} == 0$	5
Total #:	28

$\omega_{2+}^{\#1} \dagger^{\alpha\beta}$	$f_{2+}^{\#1} \dagger^{\alpha\beta}$	$\omega_{2-}^{\#1} \dagger^{\alpha\beta\chi}$
$-\frac{3k^2 r_3}{2}$	0	0
0	0	0
0	0	0

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

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

$\sigma_{2+}^{\#1} \dagger^{\alpha\beta}$	$\tau_{2+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{2-}^{\#1} \dagger^{\alpha\beta\chi}$
$-\frac{2}{3k^2 r_3}$	0	0
0	0	0
0	0	0