



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

Unitarity conditions

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

(no massless particles)

$\sigma_{1+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{1+}^{\#2} \alpha\beta$	$\tau_{1+}^{\#1} \alpha\beta$	$\sigma_{1-}^{\#1} \alpha$	$\sigma_{1-}^{\#2} \alpha$	$\tau_{1-}^{\#1} \alpha$	$\tau_{1-}^{\#2} \alpha$
$\frac{2}{3k^2r_3}$	$-\frac{2\sqrt{2}}{3k^2r_3+3k^4r_3}$	$-\frac{2i\sqrt{2}}{3kr_3+3k^3r_3}$	0	0	0	0
$-\frac{2\sqrt{2}}{3k^2r_3+3k^4r_3}$	$\frac{9k^2r_3+4t_2}{3(k+k^3)^2r_3t_2}$	$\frac{i(9k^2r_3+4t_2)}{3k(1+k^2)^2r_3t_2}$	0	0	0	0
$\frac{2i\sqrt{2}}{3kr_3+3k^3r_3}$	$-\frac{i(9k^2r_3+4t_2)}{3k(1+k^2)^2r_3t_2}$	$\frac{9k^2r_3+4t_2}{3(1+k^2)^2r_3t_2}$	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

$$\frac{2}{3}t_2\omega_{\lambda'}^{\kappa\lambda}\omega_{\kappa\lambda}^{\prime}+\frac{1}{3}t_2\omega_{\kappa\lambda}^{\prime}\omega_{\lambda'}^{\kappa\lambda}+f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}+$$

$$\frac{2}{3}r_2\partial^\beta\omega_{\kappa}^{\theta\alpha}\partial_\theta\omega_{\alpha\beta}^{\kappa}-\frac{1}{3}r_2\partial_\theta\omega_{\alpha\beta}^{\kappa}\partial_\kappa\omega_{\alpha\beta}^{\theta}-\frac{2}{3}r_2\partial_\theta\omega_{\alpha\beta}^{\kappa}\partial_\kappa\omega^{\theta\alpha\beta}+$$

$$r_3\partial_\alpha\omega_{\lambda}^{\alpha}\partial_\theta\omega_{\theta}^{\theta\kappa\lambda}-r_3\partial_\theta\omega_{\lambda}^{\alpha}\partial_\kappa\omega_{\alpha}^{\theta\kappa\lambda}+\frac{1}{6}t_2\partial^\alpha f_{\theta\kappa}^{\theta}\partial_\kappa f_{\alpha}^{\theta}-\frac{1}{6}t_2\partial_2\partial^\alpha f_{\kappa\theta}^{\theta}\partial^\kappa f_{\alpha}^{\theta}+$$

$$\frac{1}{6}t_2\partial^\alpha f_{\kappa}^{\lambda}\partial_\kappa f_{\alpha\lambda}^{\theta}+\frac{1}{3}t_2\omega_{\theta\kappa}^{\lambda}\partial_\kappa f^{\theta}-\frac{2}{3}t_2\omega_{\kappa\theta}^{\lambda}\partial^\kappa f^{\theta}-\frac{1}{3}t_2\omega_{\theta\kappa}^{\lambda}\partial^\kappa f^{\theta}+$$

$$\frac{2}{3}t_2\omega_{\theta\kappa\lambda}^{\theta}\partial^\kappa f^{\theta}-\frac{1}{6}t_2\partial^\alpha f_{\lambda}^{\kappa}\partial_\kappa f_{\alpha}^{\theta}-\frac{1}{6}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}+\frac{1}{6}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}+$$

$$\frac{1}{3}r_2\partial_\kappa\omega^{\alpha\beta\theta}\partial^\kappa\omega_{\alpha\beta\theta}+\frac{2}{3}r_2\partial_\kappa\omega^{\theta\alpha\beta}\partial^\kappa\omega_{\alpha\beta\theta}-\frac{2}{3}r_2\partial^\beta\omega_{\lambda'}^{\alpha\lambda}\partial_\lambda\omega_{\alpha\beta}^{\prime}+$$

$$\frac{2}{3}r_2\partial^\beta\omega_{\lambda'}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\prime}-4r_3\partial^\beta\omega_{\lambda'}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\prime}-r_3\partial_\alpha\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\theta}^{\theta\kappa}+r_3\partial_\theta\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\alpha}^{\theta\kappa}$$

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

$\omega_{2+}^{\#1} \dagger^{\alpha\beta}$ 
 $f_{2+}^{\#1} \dagger^{\alpha\beta}$ 
 $\omega_{2-}^{\#1} \dagger^{\alpha\beta\chi}$

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

$\sigma_{0+}^{\#1} \dagger$ 
 $\tau_{0+}^{\#1} \dagger$ 
 $\tau_{0+}^{\#2} \dagger$ 
 $\sigma_{0-}^{\#1} \dagger$

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

$\omega_{0+}^{\#1} \dagger$ 
 $f_{0+}^{\#1} \dagger$ 
 $f_{0+}^{\#2} \dagger$ 
 $\omega_{0-}^{\#1} \dagger$

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

$\sigma_{2+}^{\#1} \dagger^{\alpha\beta}$ 
 $\tau_{2+}^{\#1} \dagger^{\alpha\beta}$ 
 $\sigma_{2-}^{\#1} \dagger^{\alpha\beta\chi}$

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