



Massive particle

Pole residue:	$\frac{6 t_1 t_3 (t_1+t_3)-3 r_5 (t_1^2+2 t_3^2)}{2 r_5 (t_1+t_3) (-3 t_1 t_3+r_5 (t_1+t_3))}$	> 0
Polarisations:	3	
Square mass:	$-\frac{3 t_1 t_3}{2 r_5 t_1+2 r_5 t_3}$	> 0
Spin:	1	
Parity:	Odd	

(no massless particles)

$r_5 < 0 \ \&\& \ (t_1 < 0 \ \&\& \ 0 < t_3 < -t_1) \ || \ (t_1 > 0 \ \&\& \ (t_3 < -t_1 \ || \ t_3 > 0))$

$\sigma_{1+}^{\#1} \uparrow \alpha \beta$	$\sigma_{1+}^{\#2} \alpha \beta$	$\tau_{1+}^{\#1} \alpha \beta$	$\sigma_{1-}^{\#1} \alpha$	$\sigma_{1-}^{\#2} \alpha$	$\tau_{1-}^{\#1} \alpha$	$\tau_{1-}^{\#2} \alpha$
$\sigma_{1+}^{\#1} \uparrow \alpha \beta$	0	$-\frac{\sqrt{2}}{t_1+k^2} t_1$	0	0	0	0
$\sigma_{1+}^{\#2} \uparrow \alpha \beta$	$-\frac{\sqrt{2}}{t_1+k^2} t_1$	$-\frac{i (2 k^3 r_5-k t_1)}{(1+k^2)^2} t_1^2$	0	0	0	0
$\tau_{1+}^{\#1} \uparrow \alpha \beta$	$\frac{i \sqrt{2} k}{t_1+k^2} t_1$	$\frac{-2 k^4 r_5+k^2 t_1}{(1+k^2)^2} t_1^2$	0	0	0	0
$\sigma_{1-}^{\#1} \uparrow \alpha$	0	0	$\frac{2 (t_1+t_3)}{3 t_1 t_3+2 k^2 r_5 (t_1+t_3)}$	$-\frac{\sqrt{2} (t_1-2 t_3)}{(1+2 k^2) (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$	0	$-\frac{2 i k (t_1-2 t_3)}{(1+2 k^2) (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$
$\sigma_{1-}^{\#2} \uparrow \alpha$	0	0	$-\frac{\sqrt{2} (t_1-2 t_3)}{(1+2 k^2) (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$	$\frac{6 k^2 r_5+t_1+4 t_3}{(1+2 k^2)^2 (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$	0	$\frac{i \sqrt{2} k (6 k^2 r_5+t_1+4 t_3)}{(1+2 k^2)^2 (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$
$\tau_{1-}^{\#1} \uparrow \alpha$	0	0	0	0	0	0
$\tau_{1-}^{\#2} \uparrow \alpha$	0	0	$-\frac{2 i k (t_1-2 t_3)}{(1+2 k^2) (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$	$-\frac{i \sqrt{2} k (6 k^2 r_5+t_1+4 t_3)}{(1+2 k^2)^2 (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$	0	$\frac{2 k^2 (6 k^2 r_5+t_1+4 t_3)}{(1+2 k^2)^2 (3 t_1 t_3+2 k^2 r_5 (t_1+t_3))}$

$\omega_{1+}^{\#1} \alpha \beta$	$\omega_{1+}^{\#2} \alpha \beta$	$f_{1+}^{\#1} \alpha \beta$	$\omega_{1-}^{\#1} \alpha$	$\omega_{1-}^{\#2} \alpha$	$f_{1-}^{\#1} \alpha$	$f_{1-}^{\#2} \alpha$
$\omega_{1+}^{\#1} \uparrow \alpha \beta$	$k^2 r_5-\frac{t_1}{2}$	$-\frac{i k t_1}{\sqrt{2}}$	0	0	0	0
$\omega_{1+}^{\#2} \uparrow \alpha \beta$	$-\frac{t_1}{\sqrt{2}}$	0	0	0	0	0
$f_{1+}^{\#1} \uparrow \alpha \beta$	$\frac{i k t_1}{\sqrt{2}}$	0	0	0	0	0
$\omega_{1-}^{\#1} \uparrow \alpha$	0	0	$\frac{1}{6} (6 k^2 r_5+t_1+4 t_3)$	$\frac{t_1-2 t_3}{3 \sqrt{2}}$	0	$\frac{1}{3} i k (t_1-2 t_3)$
$\omega_{1-}^{\#2} \uparrow \alpha$	0	0	$\frac{t_1-2 t_3}{3 \sqrt{2}}$	$\frac{t_1+t_3}{3}$	0	$\frac{1}{3} i \sqrt{2} k (t_1+t_3)$
$f_{1-}^{\#1} \uparrow \alpha$	0	0	0	0	0	0
$f_{1-}^{\#2} \uparrow \alpha$	0	0	$-\frac{1}{3} i k (t_1-2 t_3)$	$-\frac{1}{3} i \sqrt{2} k (t_1+t_3)$	0	$\frac{2}{3} k^2 (t_1+t_3)$

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

Source constraints

SO(3) irreps	#
$\tau_{0+}^{\#2} == 0$	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
$\tau_{1+}^{\#1 \alpha \beta} + i k \sigma_{1+}^{\#2 \alpha \beta} == 0$	3
$\tau_{2+}^{\#1 \alpha \beta} - 2 i k \sigma_{2+}^{\#1 \alpha \beta} == 0$	5
Total #:	16

Lagrangian density

$$\begin{aligned} &-\frac{1}{3} t_1 \omega_{\prime}^{\alpha \prime} \omega_{\kappa \alpha}^{\prime \kappa}+\frac{2}{3} t_3 \omega_{\prime}^{\alpha \prime} \omega_{\kappa \alpha}^{\prime \kappa}-t_1 \omega_{\prime}^{\kappa \lambda} \omega_{\kappa \lambda}^{\prime}+f^{\alpha \beta} \tau_{\alpha \beta}+\omega^{\alpha \beta \chi} \sigma_{\alpha \beta \chi}^- \\ &r_5 \partial_{\prime} \omega_{\kappa}^{\kappa \lambda} \partial_{\prime}^{\prime} \omega_{\lambda}^{\alpha} \partial_{\alpha} \omega_{\lambda}^{\alpha}-r_5 \partial_{\alpha} \omega_{\lambda}^{\alpha} \partial_{\kappa} \omega_{\theta}^{\theta \kappa \lambda}+r_5 \partial_{\theta} \omega_{\lambda}^{\alpha} \partial_{\kappa} \omega_{\lambda}^{\theta \kappa \lambda}-r_5 \partial_{\alpha} \omega_{\lambda}^{\alpha} \partial_{\kappa} \omega^{\kappa \lambda \theta}+ \\ &2 r_5 \partial_{\theta} \omega_{\lambda}^{\alpha} \partial_{\kappa} \omega_{\alpha}^{\kappa \lambda \theta}-\frac{1}{2} t_1 \partial^{\alpha} f_{\theta \kappa} \partial_{\alpha}^{\kappa} f_{\alpha}^{\theta}-\frac{1}{2} t_1 \partial^{\alpha} f_{\kappa \theta} \partial_{\alpha}^{\kappa} f_{\alpha}^{\theta}-\frac{1}{2} t_1 \partial^{\alpha} f_{\alpha}^{\theta} \partial_{\kappa}^{\kappa} f_{\alpha \lambda}+ \\ &\frac{1}{3} t_1 \omega_{\kappa \alpha}^{\alpha} \partial^{\kappa} f_{\prime}^{\prime}-\frac{2}{3} t_3 \omega_{\kappa \alpha}^{\alpha} \partial^{\kappa} f_{\prime}^{\prime}+\frac{1}{3} t_1 \omega_{\kappa \lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}-\frac{2}{3} t_3 \omega_{\kappa \lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}+ \\ &\frac{2}{3} t_1 \partial^{\alpha} f_{\kappa \alpha} \partial^{\kappa} f_{\prime}^{\prime}-\frac{4}{3} t_3 \partial^{\alpha} f_{\kappa \alpha} \partial^{\kappa} f_{\prime}^{\prime}-\frac{1}{3} t_1 \partial_{\kappa} f_{\lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}+\frac{2}{3} t_3 \partial_{\kappa} f_{\lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}+ \\ &2 t_1 \omega_{\prime \kappa \theta} \partial^{\kappa} f_{\prime}^{\prime \theta}-\frac{1}{3} t_1 \omega_{\prime \alpha}^{\alpha} \partial^{\kappa} f_{\prime}^{\prime}+\frac{2}{3} t_3 \omega_{\prime \alpha}^{\alpha} \partial^{\kappa} f_{\prime}^{\prime}-\frac{1}{3} t_1 \omega_{\prime \lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}+ \\ &\frac{2}{3} t_3 \omega_{\prime \lambda}^{\lambda} \partial^{\kappa} f_{\prime}^{\prime}+\frac{1}{2} t_1 \partial^{\alpha} f_{\kappa}^{\kappa} \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}- \\ &\frac{1}{3} t_1 \partial^{\alpha} f_{\alpha}^{\kappa} \partial^{\kappa} f_{\lambda \kappa}+\frac{2}{3} t_3 \partial^{\alpha} f_{\alpha}^{\kappa} \partial^{\kappa} f_{\lambda \kappa}+r_5 \partial_{\alpha} \omega_{\lambda}^{\alpha} \partial^{\lambda} \omega_{\kappa}^{\theta \kappa}-r_5 \partial_{\theta} \omega_{\lambda}^{\alpha} \partial^{\lambda} \omega_{\alpha}^{\theta \kappa} \end{aligned}$$