



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

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

(No massless particles)

Lagrangian density	$\frac{2}{3} t_2 \omega_{\lambda}^{\kappa\lambda} \omega_{\kappa\lambda}^{\prime} + \frac{1}{3} t_2 \omega_{\kappa\lambda}^{\prime} \omega_{\lambda}^{\kappa\lambda} + \frac{2}{3} r_2 \partial^{\beta} \omega_{\kappa}^{\theta\alpha} \partial_{\theta} \omega_{\alpha\beta}^{\kappa} -$ $\frac{1}{3} r_2 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\alpha\beta\theta} - \frac{2}{3} r_2 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\theta\alpha\beta} + \frac{1}{6} t_2 \partial^{\alpha} f_{\theta\kappa} \partial^{\kappa} f_{\alpha}^{\theta} -$ $\frac{1}{6} t_2 \partial^{\alpha} f_{\kappa\theta} \partial^{\kappa} f_{\alpha}^{\theta} + \frac{1}{6} t_2 \partial^{\alpha} f_{\kappa}^{\lambda} \partial^{\kappa} f_{\alpha\lambda} + \frac{1}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} -$ $\frac{2}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} - \frac{1}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} + \frac{2}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} - \frac{1}{6} t_2 \partial^{\alpha} f_{\kappa}^{\lambda} \partial^{\kappa} f_{\lambda\alpha} -$ $\frac{1}{6} t_2 \partial_{\kappa} f_{\theta}^{\lambda} \partial^{\kappa} f_{\lambda}^{\theta} + \frac{1}{6} t_2 \partial_{\kappa} f_{\theta}^{\lambda} \partial^{\kappa} f_{\lambda}^{\theta} + \frac{1}{3} r_2 \partial_{\kappa} \omega^{\alpha\beta\theta} \partial^{\kappa} \omega_{\alpha\beta\theta} +$ $\frac{2}{3} r_2 \partial_{\kappa} \omega^{\theta\alpha\beta} \partial^{\kappa} \omega_{\alpha\beta\theta} - \frac{2}{3} r_2 \partial^{\beta} \omega_{\alpha\beta}^{\prime} \partial_{\lambda} \omega_{\alpha\beta}^{\prime} + \frac{2}{3} r_2 \partial^{\beta} \omega_{\alpha\beta}^{\prime} \partial_{\lambda} \omega_{\alpha\beta}^{\prime}$
Added source term:	$f^{\alpha\beta} \tau_{\alpha\beta} + \omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi}$

Lagrangian density	$\frac{2}{3} t_2 \omega_{\lambda}^{\kappa\lambda} \omega_{\kappa\lambda}^{\prime} + \frac{1}{3} t_2 \omega_{\kappa\lambda}^{\prime} \omega_{\lambda}^{\kappa\lambda} + \frac{2}{3} r_2 \partial^{\beta} \omega_{\kappa}^{\theta\alpha} \partial_{\theta} \omega_{\alpha\beta}^{\kappa} -$ $\frac{1}{3} r_2 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\alpha\beta\theta} - \frac{2}{3} r_2 \partial_{\theta} \omega_{\alpha\beta}^{\kappa} \partial_{\kappa} \omega^{\theta\alpha\beta} + \frac{1}{6} t_2 \partial^{\alpha} f_{\theta\kappa} \partial^{\kappa} f_{\alpha}^{\theta} -$ $\frac{1}{6} t_2 \partial^{\alpha} f_{\kappa\theta} \partial^{\kappa} f_{\alpha}^{\theta} + \frac{1}{6} t_2 \partial^{\alpha} f_{\kappa}^{\lambda} \partial^{\kappa} f_{\alpha\lambda} + \frac{1}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} -$ $\frac{2}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} - \frac{1}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} + \frac{2}{3} t_2 \omega_{\theta\kappa} \partial^{\kappa} f^{\theta} - \frac{1}{6} t_2 \partial^{\alpha} f_{\kappa}^{\lambda} \partial^{\kappa} f_{\lambda\alpha} -$ $\frac{1}{6} t_2 \partial_{\kappa} f_{\theta}^{\lambda} \partial^{\kappa} f_{\lambda}^{\theta} + \frac{1}{6} t_2 \partial_{\kappa} f_{\theta}^{\lambda} \partial^{\kappa} f_{\lambda}^{\theta} + \frac{1}{3} r_2 \partial_{\kappa} \omega^{\alpha\beta\theta} \partial^{\kappa} \omega_{\alpha\beta\theta} +$ $\frac{2}{3} r_2 \partial_{\kappa} \omega^{\theta\alpha\beta} \partial^{\kappa} \omega_{\alpha\beta\theta} - \frac{2}{3} r_2 \partial^{\beta} \omega_{\alpha\beta}^{\prime} \partial_{\lambda} \omega_{\alpha\beta}^{\prime} + \frac{2}{3} r_2 \partial^{\beta} \omega_{\alpha\beta}^{\prime} \partial_{\lambda} \omega_{\alpha\beta}^{\prime}$
Added source term:	$f^{\alpha\beta} \tau_{\alpha\beta} + \omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi}$

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$\omega_{1+}^{\#1} + \alpha\beta$	$\omega_{1+}^{\#1}$	$\omega_{1+}^{\#2}$	$f_{1+}^{\#1}$	$\omega_{1-}^{\#1}$	$\omega_{1-}^{\#2}$	$f_{1-}^{\#1}$	$f_{1-}^{\#2}$
$\omega_{1+}^{\#2} + \alpha\beta$	$\frac{2t_2}{3}$	$\frac{\sqrt{2}t_2}{3}$	$\frac{1}{3}i\sqrt{2}kt_2$	0	0	0	0
$f_{1+}^{\#1} + \alpha\beta$	$-\frac{1}{3}i\sqrt{2}kt_2$	$-\frac{1}{3}i\sqrt{2}kt_2$	$\frac{k^2t_2}{3}$	0	0	0	0
$\omega_{1-}^{\#1} + \alpha$	0	0	0	0	0	0	0
$\omega_{1-}^{\#2} + \alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#1} + \alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#2} + \alpha$	0	0	0	0	0	0	0

$\sigma_{1+}^{\#1+\alpha\beta}$	$\frac{6}{(3+k^2)^2 t_2}$	$\frac{3\sqrt{2}}{(3+k^2)^2 t_2}$	$\frac{3i\sqrt{2}k}{(3+k^2)^2 t_2}$	$\sigma_{1-}^{\#1}\alpha$	$\sigma_{1-}^{\#2}\alpha$	$\tau_{1-}^{\#1}\alpha$	$\tau_{1-}^{\#2}\alpha$
$\sigma_{1+}^{\#2+\alpha\beta}$	$\frac{3\sqrt{2}}{(3+k^2)^2 t_2}$	$\frac{3}{(3+k^2)^2 t_2}$	$\frac{3ik}{(3+k^2)^2 t_2}$	0	0	0	0
$\tau_{1+}^{\#1+\alpha\beta}$	$-\frac{3i\sqrt{2}k}{(3+k^2)^2 t_2}$	$-\frac{3ik}{(3+k^2)^2 t_2}$	$\frac{3k^2}{(3+k^2)^2 t_2}$	0	0	0	0
$\sigma_{1-}^{\#1+\alpha}$	0	0	0	0	0	0	0
$\sigma_{1-}^{\#2+\alpha}$	0	0	0	0	0	0	0
$\tau_{1-}^{\#1+\alpha}$	0	0	0	0	0	0	0
$\tau_{1-}^{\#2+\alpha}$	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
$\tau_{1+}^{\#1\alpha\beta} + i k \sigma_{1+}^{\#1\alpha\beta} == 0$	3
$\sigma_{1+}^{\#1\alpha\beta} == \sigma_{1+}^{\#2\alpha\beta}$	3
$\sigma_{2-}^{\#1\alpha\beta\chi} == 0$	5
$\tau_{2+}^{\#1\alpha\beta} == 0$	5
$\sigma_{2+}^{\#1\alpha\beta} == 0$	5
Total #:	36

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
$\tau_{1+}^{\#1\alpha\beta} + i k \sigma_{1+}^{\#1\alpha\beta} == 0$	3
$\sigma_{1+}^{\#1\alpha\beta} == \sigma_{1+}^{\#2\alpha\beta}$	3
$\sigma_{2-}^{\#1\alpha\beta\chi} == 0$	5
$\tau_{2+}^{\#1\alpha\beta} == 0$	5
$\sigma_{2+}^{\#1\alpha\beta} == 0$	5
Total #:	36

$\omega_2^{\#1} + \alpha\beta$	0	$f_2^{\#1} + \alpha\beta$	0	$\omega_2^{\#1} + \alpha\beta x$	0
$f_2^{\#1} + \alpha\beta$	0	0	0	0	0
$\omega_2^{\#1} + \alpha\beta x$	0	0	0	0	0

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

	$\omega_0^{+1}$	$f_0^{+1}$	$f_0^{+2}$	$\omega_0^{-1}$
$\omega_0^{+1} \dagger$	0	0	0	0
$f_0^{+1} \dagger$	0	0	0	0
$f_0^{+2} \dagger$	0	0	0	0
$\omega_0^{-1} \dagger$	0	0	0	$k^2 r_2 + t_2$

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

$\sigma_{2^+ \alpha \beta}^{\#1}$	$\tau_{2^+ \alpha \beta}^{\#1}$	$\sigma_{2^- \alpha \beta \chi}^{\#1}$
0	0	0
0	0	0
0	0	0