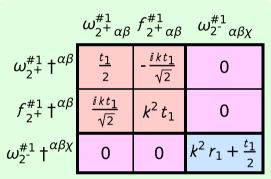
		$\sigma_{1^{+}\alpha\beta}^{\#1}$	$\sigma^{\#2}_{1}{}^{+}{}_{lphaeta}$	$ au_{1}^{\#1}{}_{lphaeta}$	$\sigma_1^{\sharp 1}{}_{lpha}$	$\sigma_{1}^{\#2}{}_{lpha}$	$\tau_{1}^{\#1}{}_{\alpha}$	τ <sub>1</sub> - α
$\sigma_{1}^{\sharp 1}$	$\dagger^{\alpha\beta}$	0	$-\frac{\sqrt{2}}{t_1+k^2t_1}$	$-\frac{i\sqrt{2}k}{t_1+k^2t_1}$	0	0	0	0
$\sigma_{1}^{\#2}$	$+^{\alpha\beta}$	$\frac{\sqrt{2}}{t_1 + k^2 t_1}$	$\frac{-2 k^2 (2 r_3 + r_5) + t_1}{(1 + k^2)^2 t_1^2}$	$\frac{-2 i k^3 (2 r_3 + r_5) + i k t_1}{(1+k^2)^2 t_1^2}$	0	0	0	0
$ au_{1}^{\#1}$	$\dagger^{\alpha\beta}$	$\frac{i\sqrt{2}k}{t_1+k^2t_1}$	$\frac{i(2k^3(2r_3+r_5)-kt_1)}{(1+k^2)^2t_1^2}$	$\frac{-2 k^4 (2 r_3 + r_5) + k^2 t_1}{(1+k^2)^2 t_1^2}$	0	0	0	0
$\sigma_1^{*}$	$^{1}$ $^{\alpha}$	0	0	0	$\frac{1}{k^2 \left( -r_1 + 2  r_3 + r_5 \right)}$	$\frac{1}{\sqrt{2} (k^2 + 2 k^4) (r_1 - 2 r_3 - r_5)}$	0	$\frac{i}{k(1+2k^2)(r_1-2r_3-r_5)}$
$\sigma_1^{\#2}$	$^{2}$ † $^{\alpha}$	0	0	0	$\frac{1}{\sqrt{2} (k^2 + 2 k^4) (r_1 - 2 r_3 - r_5)}$	$\frac{\frac{1}{-r_1+2r_3+r_5} + \frac{6k^2}{t_1}}{2(k+2k^3)^2}$	0	$\frac{i (6 k^2 (r_1 - 2 r_3 - r_5) - t_1)}{\sqrt{2} k (1 + 2 k^2)^2 (r_1 - 2 r_3 - r_5) t_1}$
$ au_1^{\#_1}$	$^{1}$ $^{\alpha}$	0	0	0	0	0	0	0
$ au_1^{\#2}$	$^{2}$ $^{\alpha}$	0	0	0	$\frac{i}{k(1+2k^2)(-r_1+2r_3+r_5)}$	$-\frac{i(6k^2(r_1-2r_3-r_5)-t_1)}{\sqrt{2}k(1+2k^2)^2(r_1-2r_3-r_5)t_1}$	0	$\frac{\frac{1}{-r_1+2r_3+r_5} + \frac{6k^2}{t_1}}{(1+2k^2)^2}$

_	$\omega_{0^+}^{\sharp 1}$	$f_{0^{+}}^{#1}$	$f_{0^{+}}^{#2}$	$\omega_0^{\#1}$	
$\omega_{0^+}^{\#1}\dagger$	$6 k^2 (-r_1 + r_3)$	0	0	0	
$f_{0^{+}}^{#1}\dagger$	0	0	0	0	
$f_{0}^{#2} \dagger$	0	0	0	0	
$\omega_{0}^{\#1}$ †	0	0	0	$-t_1$	



Total #:	$\tau_{2+}^{\#1}{}^{\alpha\beta} - 2 i k \sigma_{2+}^{\#1}{}^{\alpha\beta} == 0$	$\tau_{1+}^{\#1}{}^{\alpha\beta} + i k \sigma_{1+}^{\#2}{}^{\alpha\beta} == 0$	$\tau_1^{\#1\alpha} == 0$	$\tau_{1}^{\#2\alpha} + 2 i k \sigma_{1}^{\#2\alpha} == 0$	$\tau_{0+}^{\#1} == 0$	$\tau_{0+}^{\#2} == 0$	SO(3) irreps	Source constraints
16	5	ω	ω	ω	1	1	#	

	$\sigma_{2^{+}\alpha\beta}^{\#1}$	$ au_2^{\#1}_{lphaeta}$	$\sigma_{2}^{\#1}{}_{\alpha\beta\chi}$	
$\sigma_{2}^{\#1}\dagger^{lphaeta}$	$\frac{2}{(1+2k^2)^2t_1}$	$-\frac{2i\sqrt{2}k}{(1+2k^2)^2t_1}$	0	
$\tau_{2}^{\#1} \dagger^{\alpha\beta}$	$\frac{2 i \sqrt{2} k}{(1+2 k^2)^2 t_1}$	$\frac{4k^2}{(1+2k^2)^2t_1}$	0	
$\sigma_2^{\#1} \dagger^{\alpha\beta\chi}$	0	0	$\frac{2}{2k^2r_1+t_1}$	

Massive particle

 $-\frac{1}{-} > 0$ 

 $-\frac{t_1}{2r_1} > 0$ 

Odd

Pole residue:

Polarisations:

Square mass:

Spin:

Parity:

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

$$\sigma_{0^{+}}^{\#1} + \frac{1}{6 k^{2} (-r_{1} + r_{3})} \quad 0 \quad 0 \quad 0$$

$$\tau_{0^{+}}^{\#1} + \quad 0 \quad 0 \quad 0 \quad 0$$

$$\tau_{0^{+}}^{\#2} + \quad 0 \quad 0 \quad 0 \quad 0$$

$$\sigma_{0^{-}}^{\#1} + \quad 0 \quad 0 \quad 0 \quad -\frac{1}{t_{1}}$$

		,, , 1	. 2	
	$\sigma_{0^+}^{\sharp 1}$	$\tau_{0}^{\#1}$	$ au_0^{\#2}$	$\sigma_0^{\#1}$
+	$\frac{1}{6 k^2 (-r_1 + r_3)}$	0	0	0
†	0	0	0	0
†	0	0	0	0
				1

## **Unitarity conditions**

$$r_1 < 0 \&\& r_5 < r_1 - 2 r_3 \&\& t_1 > 0$$

Lagrangian density

 $-\frac{1}{3}t_1 \omega_i^{\alpha_i} \omega_{\kappa\alpha}^{\kappa} - t_1 \omega_i^{\kappa\lambda} \omega_{\kappa\lambda}^{i} + 2r_1 \partial_i \omega_{\kappa}^{\kappa\lambda} \partial^i \omega_{\lambda\alpha}^{\alpha} - 2r_3 \partial_i \omega_{\kappa}^{\kappa\lambda} \partial^i \omega_{\lambda\alpha}^{\alpha} -$ 

 $r_5 \partial_i \omega^{\kappa \lambda}_{\kappa} \partial^i \omega_{\lambda}^{\alpha} - \frac{2}{3} r_1 \partial^{\beta} \omega^{\theta \alpha}_{\kappa} \partial_{\theta} \omega_{\alpha \beta}^{\kappa} - \frac{2}{3} r_1 \partial_{\theta} \omega_{\alpha \beta}^{\kappa} \partial_{\kappa} \omega^{\alpha \beta \theta} +$ 

 $\frac{2}{3} r_1 \partial_{\theta} \omega_{\alpha\beta}^{\quad \kappa} \partial_{\kappa} \omega^{\theta\alpha\beta} - 2 r_1 \partial_{\alpha} \omega_{\lambda}^{\quad \alpha}_{\quad \theta} \partial_{\kappa} \omega^{\theta\kappa\lambda} + 2 r_3 \partial_{\alpha} \omega_{\lambda}^{\quad \alpha}_{\quad \theta} \partial_{\kappa} \omega^{\theta\kappa\lambda} -$ 

 $r_5 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial_{\kappa} \omega^{\theta \kappa \lambda} + 2 r_1 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial_{\kappa} \omega^{\theta \kappa \lambda} - 2 r_3 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial_{\kappa} \omega^{\theta \kappa \lambda} +$ 

 $r_5 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial_{\kappa} \omega^{\theta \kappa \lambda} + 2 r_1 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial_{\kappa} \omega^{\kappa \lambda \theta} - 2 r_3 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial_{\kappa} \omega^{\kappa \lambda \theta} -$ 

 $r_5 \, \partial_{\alpha} \omega_{\lambda \ \theta}^{\ \alpha} \, \partial_{\kappa} \omega^{\kappa \lambda \theta} - 4 \, r_1 \, \partial_{\theta} \omega_{\lambda \ \alpha}^{\ \alpha} \, \partial_{\kappa} \omega^{\kappa \lambda \theta} + 4 \, r_3 \, \partial_{\theta} \omega_{\lambda \ \alpha}^{\ \alpha} \, \partial_{\kappa} \omega^{\kappa \lambda \theta} +$ 

 $\frac{1}{2}t_1\partial^{\alpha}f^{\lambda}_{\kappa}\partial^{\kappa}f_{\alpha\lambda} + \frac{1}{3}t_1\omega_{\kappa\alpha}^{\alpha}\partial^{\kappa}f'_{i} + \frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^{\kappa}f'_{i} + \frac{2}{3}t_1\partial^{\alpha}f_{\kappa\alpha}\partial^{\kappa}f'_{i} -$ 

 $\frac{1}{3} t_1 \partial_{\kappa} f^{\lambda}_{\lambda} \partial^{\kappa} f'_{i} + 2 t_1 \omega_{i\kappa\theta} \partial^{\kappa} f'^{\theta} - \frac{1}{3} t_1 \omega_{i\alpha}^{\alpha} \partial^{\kappa} f'_{\kappa} - \frac{1}{3} t_1 \omega_{i\lambda}^{\lambda} \partial^{\kappa} f'_{\kappa} +$ 

 $2r_5\partial_\theta\omega_{\lambda}^{\alpha}\partial_\kappa\omega^{\kappa\lambda\theta} - \frac{1}{2}t_1\partial^\alpha f_{\theta\kappa}\partial^\kappa f_{\alpha}^{\theta} - \frac{1}{2}t_1\partial^\alpha f_{\kappa\theta}\partial^\kappa f_{\alpha}^{\theta} - \frac{1}{2}t_1\partial^\alpha f_{\kappa\theta}\partial^\kappa f_{\alpha}^{\theta}$ 

 $\frac{1}{2}t_1\partial^{\alpha}f^{\lambda}_{\kappa}\partial^{\kappa}f_{\lambda\alpha} + \frac{1}{2}t_1\partial_{\kappa}f^{\lambda}_{\theta}\partial^{\kappa}f^{\theta}_{\lambda} + \frac{1}{2}t_1\partial_{\kappa}f^{\lambda}_{\theta}\partial^{\kappa}f^{\theta}_{\lambda} -$ 

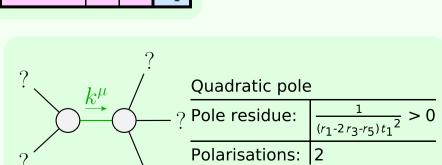
 $\frac{1}{3} t_1 \partial^{\alpha} f^{\lambda}_{\alpha} \partial^{\kappa} f_{\lambda \kappa} + \frac{2}{3} r_1 \partial_{\kappa} \omega^{\alpha \beta \theta} \partial^{\kappa} \omega_{\alpha \beta \theta} - \frac{2}{3} r_1 \partial_{\kappa} \omega^{\theta \alpha \beta} \partial^{\kappa} \omega_{\alpha \beta \theta} +$ 

 $\frac{2}{3} r_1 \partial^{\beta} \omega_{I}^{\alpha \lambda} \partial_{\lambda} \omega_{\alpha \beta}^{I} + \frac{4}{3} r_1 \partial^{\beta} \omega_{I}^{\lambda \alpha} \partial_{\lambda} \omega_{\alpha \beta}^{I} - 4 r_3 \partial^{\beta} \omega_{I}^{\lambda \alpha} \partial_{\lambda} \omega_{\alpha \beta}^{I} +$ 

 $2 r_1 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa} - 2 r_3 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa} + r_5 \partial_{\alpha} \omega_{\lambda \theta}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa} -$ 

 $2 r_1 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa} + 2 r_3 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa} - r_5 \partial_{\theta} \omega_{\lambda \alpha}^{\alpha} \partial^{\lambda} \omega^{\theta \kappa}_{\kappa}$ 

Added source term:  $f^{\alpha\beta} \tau_{\alpha\beta} + \omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi}$ 



	0		
+2,	i k <sup>2</sup> ) (r	1-2 <i>r</i> 3	3-r <u>5</u>
		r <sub>3</sub> -r <sub>5</sub> ) (r <sub>1</sub> -2)	
	0		
+2	1 . r <sub>3</sub> +/ 1+2 k	$\frac{1}{(5)^2} + \frac{6}{t}$	k <sup>2</sup>
$r^{*2} == 0$	SO(3) irreps	Source constraints	
_	#		
	Hr	nitar	ity

$f_{1-}^{#2} + ^{\alpha}$	$f_{1}^{#1} + ^{\alpha}$	$\omega_{1}^{#2} + \alpha$	$\omega_{1^{-}}^{#1}\dagger^{lpha}$	$f_{1+}^{#1} + \alpha \beta$	$\omega_{1+}^{#2} \dagger^{\alpha\beta}$	$\omega_{1^+}^{\#1} \dagger^{lphaeta}$	
0	0	0	0	$\frac{ikt_1}{\sqrt{2}}$	$-\frac{t_1}{\sqrt{2}}$	$\omega_{1+}^{*1} + \alpha^{\beta} k^2 (2r_3 + r_5) - \frac{t_1}{2}$	$\omega_{1}^{\#1}{}_{lphaeta}$
0	0	0	0	0	0	$-\frac{\sqrt{2}}{\sqrt{1}}$	$\omega_{1+\alpha\beta}^{\#2}f_{1+\alpha\beta}^{\#1}$
0	0	0	0	0	0	$-\frac{ikt_1}{\sqrt{2}}$	$f_{1}^{\#1}_{lpha eta}$
$-rac{1}{3}ar{l}kt_1$	0	$\frac{t_1}{3\sqrt{2}}$	$k^2 \left( -r_1 + 2  r_3 + r_5 \right) + \frac{t_1}{6}$	0	0	0	$\omega_{1^-lpha}^{\#1}$
$-\frac{1}{3}i\sqrt{2}kt_1$	0	<u>t₁</u> 3	$\frac{t_1}{3\sqrt{2}}$	0	0	0	$\omega_{1^-}^{\#2}{}_{lpha}$
0	0	0	0	0	0	0	$f_{1^{-}\alpha}^{\#1}$
2 k <sup>2</sup> t <sub>1</sub>	0	$\frac{1}{3}$ $\bar{l}$ $\sqrt{2}$ $k$	<u>ikt</u> 3	0	0	0	$f_{1^-\alpha}^{\#2}$