Lagrangian density
$-t_1  \omega_{_{K}\alpha}^{\ \alpha'}  \omega_{_{K}\alpha}^{\ \ \kappa'} - \frac{1}{3} t_1  \omega_{_{K}\lambda}^{\ \ \kappa\lambda} + \frac{2}{3} t_2  \omega_{_{K}\lambda}^{\ \ \kappa\lambda} + \frac{1}{3} t_1  \omega_{_{K}\lambda}^{\ \ \ \kappa\lambda} + \frac{1}{3} t_1  \omega_{_{K}\lambda}^{\ \ \ \kappa\lambda} + \frac{1}{3} t_1  \omega_{_{K}\lambda}^{\ \ \ \ \kappa\lambda} + \frac{1}{3} t_1  \omega_{_{K}\lambda}^{\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
$rac{1}{3}t_2\;\omega_{\kappa\lambda}^{\prime}\;\;\omega^{\kappa\lambda}^{\prime}+2r_1\partial_{\scriptscriptstyle l}\omega^{\kappa\lambda}^{\prime}\;\partial^{\scriptscriptstyle l}\omega_{\lambda}^{\alpha}^{}-rac{2}{3}r_1\partial^{\scriptscriptstyle eta}\omega^{\thetalpha}_{\kappa}\partial_{\scriptscriptstyle  heta}\omega_{lpha}^{\kappa}-$
$\frac{2}{3}r_{1}\partial_{\theta}\omega_{\alpha\beta}^{}{}^{\kappa}\partial_{\kappa}\omega^{\alpha\beta\theta} + \frac{2}{3}r_{1}\partial_{\theta}\omega_{\alpha\beta}^{}{}^{\kappa}\partial_{\kappa}\omega^{\theta\alpha\beta} + 2r_{1}\partial_{\alpha}\omega_{\lambda}^{\alpha}{}_{\theta}\partial_{\kappa}\omega^{\theta\kappa\lambda} -$
$2r_{1}\partial_{\theta}\omega_{\lambda}^{\ \alpha}\partial_{\kappa}\omega^{\theta\kappa\lambda} + 2r_{1}\partial_{\alpha}\omega_{\lambda}^{\ \alpha}\partial_{\kappa}\omega^{\kappa\lambda\theta} - 4r_{1}\partial_{\theta}\omega_{\lambda}^{\ \alpha}\partial_{\kappa}\omega^{\kappa\lambda\theta} -$
$rac{1}{3}t_1\partial^{lpha}\!f_{$
$\frac{1}{6}t_2\partial^\alpha f_{\kappa\theta}\partial^\kappa f_\alpha^{\theta} - \frac{1}{3}t_1\partial^\alpha f^\lambda_{\kappa}\partial^\kappa f_{\alpha\lambda} + \frac{1}{6}t_2\partial^\alpha f^\lambda_{\kappa}\partial^\kappa f_{\alpha\lambda} + t_1\omega_{\kappa\alpha}^{\alpha}\partial^\kappa f'_{\mu} +$
$t_1 \; \omega_{\kappa\lambda}^{\;\;\lambda} \; \partial^\kappa f'_{\;\; ,} + 2  t_1  \partial^\alpha f_{\;\;\kappa\alpha}  \partial^\kappa f'_{\;\; ,} - t_1  \partial_\kappa f^\lambda_{\;\;\lambda}  \partial^\kappa f'_{\;\; ,} + \frac{1}{3}  t_1 \; \omega_{l\theta\kappa} \; \partial^\kappa f'^\theta  +$
$\frac{1}{3}t_{2}\ \omega_{I\theta K}\ \partial^{\kappa}f^{I\theta} + \frac{4}{3}t_{1}\ \omega_{IK\theta}\ \partial^{\kappa}f^{I\theta} - \frac{2}{3}t_{2}\ \omega_{IK\theta}\ \partial^{\kappa}f^{I\theta} - \frac{1}{3}t_{1}\ \omega_{\theta IK}\ \partial^{\kappa}f^{I\theta} -$
$\frac{1}{3}t_{2}\ \omega_{\theta IK}\ \partial^{\kappa}f^{I\theta} + \frac{2}{3}t_{1}\ \omega_{\theta KI}\ \partial^{\kappa}f^{I\theta} + \frac{2}{3}t_{2}\ \omega_{\theta KI}\ \partial^{\kappa}f^{I\theta} - t_{1}\ \omega_{I\alpha}^{\ \alpha}\ \partial^{\kappa}f^{I}_{\ \kappa} -$
$t_1\;\omega_{_{I}\lambda}^{\lambda}\partial^{\kappa}f_{\kappa}}^{}+\tfrac{1}{3}t_1\partial^{\alpha}f_{\kappa}}^{\lambda}\partial^{\kappa}f_{\kappa}}^{\kappa}}-\tfrac{1}{6}t_2\partial^{\alpha}f_{\kappa}}^{\kappa}}\partial^{\kappa}f_{\kappa}}^{\kappa}}+\tfrac{1}{3}t_1\partial_{\kappa}f_{\kappa}}^{\kappa}}\partial^{\kappa}f_{\kappa}}^{\kappa}}-$
$\frac{1}{6}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta} + \frac{2}{3}t_1\partial_\kappa f^{\lambda}_{\theta}\partial^\kappa f_{\lambda}^{\theta} + \frac{1}{6}t_2\partial_\kappa f^{\lambda}_{\theta}\partial^\kappa f_{\lambda}^{\theta} - t_1\partial^\alpha f^{\lambda}_{\alpha}\partial^\kappa f_{\lambda\kappa} +$
$rac{2}{3}r_1\partial_\kappa\omega^{lphaeta heta}\partial^\kappa\omega_{lphaeta heta}-rac{2}{3}r_1\partial_\kappa\omega^{ hetalphaeta}\partial^\kappa\omega_{lphaeta heta}+rac{2}{3}r_1\partial^\beta\omega_{lphalpha}^{\ lpha\lambda}\partial_\lambda\omega_{lphaeta}^{\ \prime}-$
$rac{8}{3}r_1\partial^{eta}\omega_{\lambda}{}^{\lambdalpha}\partial_{\lambda}\omega_{lphaeta}{}^{\prime}$ - $2r_1\partial_{lpha}\omega_{\lambda}{}^{lpha}\partial^{\lambda}\omega^{ heta\kappa}{}_{\kappa}+2r_1\partial_{ heta}\omega_{\lambda}{}^{lpha}\partial^{\lambda}\omega^{ heta\kappa}{}_{\kappa}$
Added source term: $\left f^{\alpha\beta} \ \tau_{\alpha\beta} + \omega^{\alpha\beta\chi} \ \sigma_{\alpha\beta\chi} \right $

$\tau_{1}^{\#2}{}_{\alpha}$	0	0	0	$\frac{2ik}{t_1 + 2k^2t_1}$	$\frac{i\sqrt{2}k(2k^2r_1+t_1)}{(t_1+2k^2t_1)^2}$	0	$\frac{2k^2(2k^2r_1+t_1)}{(t_1+2k^2t_1)^2}$
$\tau_{1^-}^{\#_1}\alpha$	0	0	0	0	0	0	0
$\sigma_{1^{-}\alpha}^{\#2}$	0		0	$\frac{\sqrt{2}}{t_1 + 2k^2t_1}$	$\frac{2k^2r_1+t_1}{(t_1+2k^2t_1)^2}$	0	$-\frac{i\sqrt{2}k(2k^2r_1+t_1)}{(t_1+2k^2t_1)^2}$
$\sigma_{1^{-}\alpha}^{\#1}$	0	0	0	0	$\frac{\sqrt{2}}{t_1 + 2k^2t_1}$	0	$-\frac{2ik}{t_1+2k^2t_1}$
$\tau_{1}^{\#1}_{\alpha\beta}$	$\frac{i\sqrt{2}k(t_1-2t_2)}{3(1+k^2)t_1t_2}$	$\frac{i k (t_1 + 4t_2)}{3 (1 + k^2)^2 t_1 t_2}$	$\frac{k^2 (t_1 + 4t_2)}{3 (1 + k^2)^2 t_1 t_2}$	0	0	0	0
$\sigma_{1}^{\#2}$	$\frac{\sqrt{2} (t_1 - 2t_2)}{3 (1 + k^2) t_1 t_2}$	$\frac{t_1+4t_2}{3(1+k^2)^2t_1t_2}$	$-\frac{ik(t_1+4t_2)}{3(1+k^2)^2t_1t_2}$	0	0	0	0
$\sigma_{1}^{\#1}{}_{\alpha\beta}$	$\frac{2(t_1+t_2)}{3t_1t_2}$	$\frac{\sqrt{2} (t_1 - 2t_2)}{3(1+k^2)t_1t_2}$	$\tau_{1}^{\#1} + \alpha \beta = \frac{i \sqrt{2} k(t_{1} - 2t_{2})}{3(1 + k^{2})t_{1}t_{2}}$	0	0	0	0
	$\sigma_{1}^{\#1} + ^{\alpha \beta}$	$\sigma_{1}^{#2} + \alpha \beta$	$\tau_1^{\#1} + \alpha \beta$	$\sigma_{1}^{\#_{1}} +^{\alpha}$	$\sigma_1^{\#2} +^{\alpha}$	$\tau_{1}^{\#1} +^{lpha}$	$\tau_1^{\#2} + \alpha$

α				, 1			
$f_1^{\#2}$	0	0	0	$i k t_1$	0	0	0
$\omega_{1^-}^{\#2}{}_{lpha}f_{1^-}^{\#1}{}_{lpha}$	0	0	0	0	0	0	0
$\omega_{1^{-}}^{\#2}{}_{\alpha}$	0	0	0	$\frac{t_1}{\sqrt{2}}$	0	0	0
$\omega_{1^{^{-}}\alpha}^{\#1}$	0	0	0	$-k^2 r_1 - \frac{t_1}{2}$	$\frac{t_1}{\sqrt{2}}$	0	$-ikt_1$ 0
$f_{1}^{\#1}$	$-\frac{ik(t_1-2t_2)}{3\sqrt{2}}$	$\frac{1}{3}$ i k (t <sub>1</sub> + t <sub>2</sub> )	$\frac{1}{3} k^2 (t_1 + t_2)$	0	0	0	0
$\omega_{1}^{\#2}{}_{\alpha\beta}$	$-\frac{t_1-2t_2}{3\sqrt{2}}$	$\frac{t_1+t_2}{3}$	$-\frac{1}{3}\bar{i}k(t_1+t_2)\bigg \frac{1}{3}k^2(t_1+t_2)$	0	0	0	0
$\omega_{1}^{\#1}{}_{\alpha\beta}$	$\frac{1}{6}(t_1+4t_2)$	$-\frac{t_1-2t_2}{3\sqrt{2}}$	$\frac{ik(t_1-2t_2)}{3\sqrt{2}}$	0	0	0	0
	$\omega_1^{#1} + \alpha \beta \frac{1}{6}$	$\omega_1^{\#2} + \alpha^{\beta}$	$f_{1}^{\#1} + \alpha \beta$	$\omega_{1^{\bar{-}}}^{\#1} +^{\alpha}$	$\omega_1^{\#2} +^{\alpha}$	$f_{1}^{\#1} \dagger^{lpha}$	$f_1^{\#2} +^{\alpha}$

		U	$\nu_{2}^{\#1}$	$_{\beta}f_{2}^{\#1}$	L αβ	$\omega_2^{\#1}$	ιβχ	
$\omega_2^{\dagger}$	#1 2+ †	αβ	<u>t</u> 1 2	- <u>i k</u>	<u>tt1</u> √2	0		
$f_{2}^{3}$	# <sub>1</sub> †	αβ	$\frac{ikt_1}{\sqrt{2}}$	k <sup>2</sup>	$t_1$	0		
$\omega_2^{\#}$	<sup>1</sup> † <sup>a</sup>	ιβχ	0	(	)	$k^2 r_1 +$	$+\frac{t_1}{2}$	
	#	1	1	3	٣	m	2	16
Source constraints	SO(3) irreps	$\tau_{0+}^{\#2} == 0$	$\tau_{0+}^{\#1} - 2  \bar{l}  k  \sigma_{0+}^{\#1} == 0$	$t_1^{\#2}\alpha + 2ik o_1^{\#2}\alpha == 0$	$t_1^{\#1}\alpha == 0$	$\tau_{1+}^{\#1}\alpha\beta + ik \ \sigma_{1+}^{\#2}\alpha\beta == 0$	$\tau_2^{\#_1^1\alpha\beta} - 2ik \sigma_2^{\#_1^1\alpha\beta} = 0$	Total #:

Source constraints	SO(3) irreps	$t_0^{\#2} == 0$	$\tau_{0}^{\#1} - 2 i k \sigma_{0}^{\#1} == 0$	$\tau_1^{\#2\alpha} + 2ik \ \sigma_1^{\#2\alpha} = 0$	$\tau_{1}^{\#1}{}^{\alpha} == 0$	$\tau_1^{\#1}{}^{\alpha\beta} + ik \ \sigma_1^{\#2}{}^{\alpha\beta} == 0$	$\tau_2^{\#1}\alpha\beta - 2ik \ \sigma_2^{\#1}\alpha\beta == 0$	Total #:	
		C	$J_0^{\#1}$		$ au_0^{\#}$	1	$ au_{0}^{\#2}$	$\sigma_0^{\#1}$	
$\sigma_0^{\sharp 1}$	†	- (1+2	$\frac{1}{2k^2)^2}$	$\frac{-}{t_1}$	$\frac{i\sqrt{2}}{(1+2k^2)}$	$\frac{k}{(t)^2 t_1}$	0	0	
$ au_{0}^{\#1}$ $ au_{0}^{\#2}$ $ au_{0}^{\#2}$ $ au_{0}^{\#1}$	†	- <u>i</u>	$\frac{\sqrt{2} k}{2 k^2)^2}$	$\frac{1}{t_1}$	$\frac{2k}{(1+2k^2)}$	$\frac{2}{(2)^2 t_1}$	0	0	
$ au_{0}^{\#2}$	†		0		0		0	0	
$\sigma_0^{\#1}$	†		0		0		0	$\frac{1}{t_2}$	

•	$\sigma_2^{\#1} + \alpha \beta$	$t_{\perp}^{\#1} + \alpha \beta$	- ×	$\sigma_{2}^{\#1} + {}^{\alpha \rho \chi}$
	$\sigma_2^*$	#1	7	$\sigma_2^{\#_1}$
$\omega_{0}^{\#1}$	0	0	0	$t_2$
$f_{0}^{#2}$	0	0	0	0
$f_0^{#1}$	$i\sqrt{2}kt_1$	$-2 k^2 t_1$	0	0
$\omega_{0}^{\#1}$	-t <sub>1</sub>	$-i\sqrt{2} kt_1$	0	0
	$\omega_{0}^{\#1}$ †	$f_{0}^{#1}$ †	$f_{0}^{#2} \uparrow$	$\omega_{0^-}^{\#1}$ $\dagger$

 $\frac{2}{2k^2r_1+t_1}$ 

0

0

 $\sigma_{2^{-}}^{\#1} \alpha eta \chi$ 

 $\sigma_{2}^{\#1}{}_{\alpha\beta}$ 

0

0

	Massive partic	le
? $J^P = 2^- $ ?	Pole residue:	$-\frac{1}{r_1} >$
$J^2 \equiv 2$	Polarisations:	5
$k^{\mu}$	Square mass:	$-\frac{t_1}{2r_1} >$
?	Spin:	2
	Parity:	Odd

9	Massive particle							
	Pole residue:	$-\frac{1}{r_1} > 0$						
	Polarisations:	5						
	Square mass:	$-\frac{t_1}{2r_1} > 0$						
	Spin:	2						
	Parity:	Odd						

_
0
$\neg$
ゴ
بو
Ş
<u> </u>
าลรรโеรร
S
v
$\overline{o}$
pa
ユ
□.
<u>C</u>
les
Š