

	$\omega_1^{\#1} + \alpha\beta$	$\omega_1^{\#2} + \alpha\beta$	$f_1^{\#1} + \alpha\beta$	$\omega_1^{\#1} - \alpha$	$\omega_1^{\#2} - \alpha$	$f_1^{\#1} - \alpha$	$f_1^{\#2} - \alpha$
$\omega_1^{\#1} + \alpha\beta$	$k^2(2r_3 + r_5) - \frac{t_1}{2}$	$-\frac{t_1}{\sqrt{2}}$	$-\frac{i k t_1}{\sqrt{2}}$	0	0	0	0
$\omega_1^{\#2} + \alpha\beta$	$-\frac{t_1}{\sqrt{2}}$	0	0	0	0	0	0
$f_1^{\#1} + \alpha\beta$	$\frac{i k t_1}{\sqrt{2}}$	0	0	0	0	0	0
$\omega_1^{\#1} - \alpha$	0	0	0	$k^2(2r_3 + r_5) + \frac{t_1}{6}$	$\frac{t_1}{3\sqrt{2}}$	0	$\frac{i k t_1}{3}$
$\omega_1^{\#2} - \alpha$	0	0	0	$\frac{t_1}{3\sqrt{2}}$	$\frac{t_1}{3}$	0	$\frac{1}{3} i \sqrt{2} k t_1$
$f_1^{\#1} - \alpha$	0	0	0	0	0	0	0
$f_1^{\#2} - \alpha$	0	0	0	$-\frac{1}{3} i k t_1$	$-\frac{1}{3} i \sqrt{2} k t_1$	0	$\frac{2 k^2 t_1}{3}$

## Lagrangian density

$$\begin{aligned}
& -\frac{1}{3}t_1\omega_{,\lambda}^{\alpha'}\omega_{\kappa\alpha}^{\kappa}-t_1\omega_{,\lambda}^{\kappa\lambda}\omega_{\kappa\lambda}^{\lambda}-2r_3\partial_\mu\omega_{\lambda}^{\kappa\lambda}\partial^\mu\omega_{\lambda}^{\alpha}- \\
& -r_5\partial_\mu\omega_{\lambda}^{\kappa\lambda}\partial^\mu\omega_{\lambda}^{\alpha}+\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}+2r_3\partial_\alpha\omega_{\lambda}^{\alpha}\partial_\theta\omega^{\theta\kappa\lambda}-r_5\partial_\alpha\omega_{\lambda}^{\alpha}\partial_\theta\omega^{\theta\kappa\lambda}- \\
& -2r_3\partial_\theta\omega_{\lambda}^{\alpha}\partial_\kappa\omega^{\theta\kappa\lambda}+r_5\partial_\theta\omega_{\lambda}^{\alpha}\partial_\kappa\omega^{\theta\kappa\lambda}-2r_3\partial_\alpha\omega_{\lambda}^{\alpha}\partial_\theta\omega^{\kappa\lambda\theta}- \\
& -r_5\partial_\alpha\omega_{\lambda}^{\alpha}\partial_\theta\omega^{\kappa\lambda\theta}+4r_3\partial_\theta\omega_{\lambda}^{\alpha}\partial_\kappa\omega^{\kappa\lambda\theta}+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}^{\lambda}\partial^\kappa f_{\alpha\lambda}+ \\
& +\frac{1}{3}t_1\omega_{\kappa\alpha}^{\alpha}\partial^\kappa f_{,\lambda}^{\lambda}+\frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{,\lambda}^{\lambda}+\frac{2}{3}t_1\partial^\alpha f_{\kappa\alpha}\partial^\kappa f_{,\lambda}^{\lambda}-\frac{1}{3}t_1\partial_\kappa f_{\lambda}^{\lambda}\partial^\kappa f_{,\lambda}^{\lambda}+ \\
& +2t_1\omega_{,\lambda\kappa\theta}\partial^\kappa f_{,\lambda}^{\theta}-\frac{1}{3}t_1\omega_{,\lambda\alpha}^{\alpha}\partial^\kappa f_{,\kappa}^{\lambda}-\frac{1}{3}t_1\omega_{,\lambda\lambda}^{\lambda}\partial^\kappa f_{,\kappa}^{\lambda}+\frac{1}{2}t_1\partial^\alpha f_{\lambda}^{\lambda}\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_{\lambda}^{\lambda}\partial^\kappa f_{\lambda\kappa}+ \\
& +\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}^{\lambda}+ \\
& +\frac{2}{3}r_2\partial^\beta\omega_{,\lambda}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\lambda}-4r_3\partial^\beta\omega_{,\lambda}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\lambda}-2r_3\partial_\alpha\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\kappa}^{\theta\kappa}+ \\
& +r_5\partial_\alpha\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\kappa}^{\theta\kappa}+2r_3\partial_\theta\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\kappa}^{\theta\kappa}-r_5\partial_\theta\omega_{\lambda}^{\alpha}\partial^\lambda\omega_{\kappa}^{\theta\kappa}
\end{aligned}$$

	$\sigma_{1^+ \alpha \beta}^{\#1}$	$\sigma_{1^+ \alpha \beta}^{\#2}$	$\tau_{1^+ \alpha \beta}^{\#1}$	$\sigma_{1^- \alpha}^{\#1}$	$\sigma_{1^- \alpha}^{\#2}$	$\tau_{1^- \alpha}^{\#1}$	$\tau_{1^- \alpha}^{\#2}$
$\sigma_{1^+}^{\#1} \dagger^{\alpha \beta}$	0	$-\frac{\sqrt{2}}{t_1+k^2 t_1}$	$-\frac{i \sqrt{2} k}{t_1+k^2 t_1}$	0	0	0	0
$\sigma_{1^+}^{\#2} \dagger^{\alpha \beta}$	$-\frac{\sqrt{2}}{t_1+k^2 t_1}$	$\frac{-2 k^2 (2 r_3+r_5)+t_1}{(1+k^2)^2 t_1^2}$	$\frac{-2 i k^3 (2 r_3+r_5)+i k t_1}{(1+k^2)^2 t_1^2}$	0	0	0	0
$\tau_{1^+}^{\#1} \dagger^{\alpha \beta}$	$\frac{i \sqrt{2} k}{t_1+k^2 t_1}$	$\frac{i (2 k^3 (2 r_3+r_5)-k t_1)}{(1+k^2)^2 t_1^2}$	$\frac{-2 k^4 (2 r_3+r_5)+k^2 t_1}{(1+k^2)^2 t_1^2}$	0	0	0	0
$\sigma_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	$\frac{1}{k^2 (2 r_3+r_5)}$	$-\frac{1}{\sqrt{2} (k^2+2 k^4) (2 r_3+r_5)}$	0	$-\frac{i}{k (1+2 k^2) (2 r_3+r_5)}$
$\sigma_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	$-\frac{1}{\sqrt{2} (k^2+2 k^4) (2 r_3+r_5)}$	$\frac{6 k^2 (2 r_3+r_5)+t_1}{2 (k+2 k^3)^2 (2 r_3+r_5) t_1}$	0	$\frac{i (6 k^2 (2 r_3+r_5)+t_1)}{\sqrt{2} k (1+2 k^2)^2 (2 r_3+r_5) t_1}$
$\tau_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0
$\tau_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	$\frac{i}{k (1+2 k^2) (2 r_3+r_5)}$	$-\frac{i (6 k^2 (2 r_3+r_5)+t_1)}{\sqrt{2} k (1+2 k^2)^2 (2 r_3+r_5) t_1}$	0	$\frac{6 k^2 (2 r_3+r_5)+t_1}{(1+2 k^2)^2 (2 r_3+r_5) t_1}$

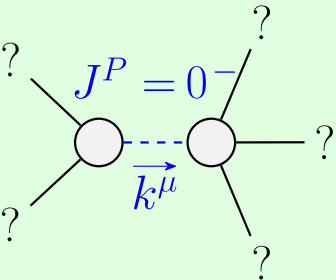
	$\sigma_{0+}^{\#1}$	$\tau_{0+}^{\#1}$	$\tau_{0+}^{\#2}$	$\sigma_{0-}^{\#1}$
$\#1_{0+}^{\#1}$	$\frac{1}{6k^2 r_3}$	0	0	0
$\#1_{0+}^{\#1}$	0	0	0	0
$\#2_{0+}^{\#2}$	0	0	0	0
$\#1_{0-}^{\#1}$	0	0	0	$\frac{1}{k^2 r_2 + t_1}$

$$\begin{array}{c}
 \omega_{2^+}^{\#1} \alpha \beta \quad \omega_{2^+}^{\#2} \alpha \beta \quad \omega_{2^+}^{\#1} \alpha \beta \chi \\
 \begin{array}{|c|c|c|}
 \hline
 \omega_{2^+}^{\#1} \dagger \alpha \beta & \frac{t_1}{2} & -\frac{i k t_1}{\sqrt{2}} & 0 \\
 \hline
 \omega_{2^+}^{\#2} \dagger \alpha \beta & \frac{i k t_1}{\sqrt{2}} & k^2 t_1 & 0 \\
 \hline
 \omega_{2^+}^{\#1} \dagger \alpha \beta \chi & 0 & 0 & \frac{t_1}{2} \\
 \hline
 \end{array}
 \end{array}$$

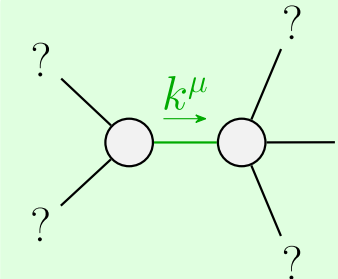
	$\omega_{0+}^{\#1}$	$f_{0+}^{\#1}$	$f_{0+}^{\#2}$	$\omega_{0-}^{\#1}$
$\omega_{0+}^{\#1} \dagger$	$6k^2 r_3$	0	0	0
$f_{0+}^{\#1} \dagger$	0	0	0	0
$f_{0+}^{\#2} \dagger$	0	0	0	0
$\omega_{0-}^{\#1} \dagger$	0	0	0	$k^2 r_2 - t_1$

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

Source constraints	#
SO(3) irreps	
$\tau_{0+}^{#2} = 0$	1
$\tau_{0+}^{#1} = 0$	1
$\tau_1^{#2\alpha} + 2ik\sigma_1^{#2\alpha} = 0$	3
$\tau_1^{#1\alpha} = 0$	3
$\tau_{1+}^{#1\alpha\beta} + ik\sigma_{1+}^{#2\alpha\beta} = 0$	3
$\tau_{2+}^{#1\alpha\beta} - 2ik\sigma_{2+}^{#1\alpha\beta} = 0$	5
Total #:	16



Massive particle	
Pole residue:	$-\frac{1}{r_2} > 0$
Polarisations:	1
Square mass:	$\frac{t_1}{r_2} > 0$
Spin:	0
Parity:	Odd



Quadratic pole	
Pole residue:	$-\frac{1}{(2r_3+r_5)t_1^2} > 0$
Polarisations:	2

### Unitarity conditions

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$$r_2 < 0 \ \&\& \ r_5 < -2 \ r_3 \ \&\& \ t_1 < 0$$