

Wave operator and propagator

	$\omega_{1^+ \alpha \beta}^{\#1}$	$\omega_{1^+ \alpha \beta}^{\#2}$	$f_{1^+ \alpha \beta}^{\#1}$	$\omega_{1^- \alpha}^{\#1}$	$\omega_{1^- \alpha}^{\#2}$	$f_{1^- \alpha}^{\#1}$	$f_{1^- \alpha}^{\#2}$
$\omega_{1^+ \dagger \alpha \beta}^{\#1}$	$k^2 (2r_3 + r_5) + \frac{2t_2}{3}$	$\frac{\sqrt{2} t_2}{3}$	$\frac{1}{3} i \sqrt{2} k t_2$	0	0	0	0
$\omega_{1^+ \dagger \alpha \beta}^{\#2}$	$\frac{\sqrt{2} t_2}{3}$	$\frac{t_2}{3}$	$\frac{i k t_2}{3}$	0	0	0	0
$f_{1^+ \dagger \alpha \beta}^{\#1}$	$-\frac{1}{3} i \sqrt{2} k t_2$	$-\frac{1}{3} i k t_2$	$\frac{k^2 t_2}{3}$	0	0	0	0
$\omega_{1^- \dagger \alpha}^{\#1}$	0	0	0	$k^2 (\frac{r_3}{2} + r_5) + \frac{2t_3}{3}$	$-\frac{\sqrt{2} t_3}{3}$	0	$-\frac{2}{3} i k t_3$
$\omega_{1^- \dagger \alpha}^{\#2}$	0	0	0	$-\frac{\sqrt{2} t_3}{3}$	$\frac{t_3}{3}$	0	$\frac{1}{3} i \sqrt{2} k t_3$
$f_{1^- \dagger \alpha}^{\#1}$	0	0	0	0	0	0	0
$f_{1^- \dagger \alpha}^{\#2}$	0	0	0	$\frac{2 i k t_3}{3}$	$-\frac{1}{3} i \sqrt{2} k t_3$	0	$\frac{2 k^2 t_3}{3}$

$\sigma_0^{\#1} \uparrow$	$f_0^{\#1}$	$\tau_0^{\#2}$	$\sigma_0^{\#1}$
$\sigma_0^{\#1} \uparrow$	$\frac{1}{(1+2k^2)t_3}$	$-\frac{i\sqrt{2}k}{(1+2k^2)^2t_3}$	0
$\tau_0^{\#1} \uparrow$	$\frac{i\sqrt{2}k}{(1+2k^2)^2t_3}$	$\frac{2k^2}{(1+2k^2)^2t_3}$	0
$\tau_0^{\#2} \uparrow$	0	0	0
$\sigma_0^{\#1} \uparrow$	0	0	$\frac{1}{k^2r_2+t_2}$

$\omega_0^{\#1}$	$f_0^{\#1}$	$f_0^{\#2}$	$\omega_0^{\#1}$
$\omega_0^{\#1} \uparrow$	t_3	$-i\sqrt{2}kt_3$	0
$f_0^{\#1} \uparrow$	$i\sqrt{2}kt_3$	$2k^2t_3$	0
$f_0^{\#2} \uparrow$	0	0	0
$\omega_0^{\#1} \uparrow$	0	0	$k^2r_2+t_2$

$\omega_2^{\#1}$	$f_2^{\#1}$	$\omega_2^{\#2}$	$\alpha\beta X$
$\omega_2^{\#1} \uparrow$	$-\frac{3k^2r_3}{2}$	0	0
$f_2^{\#1} \uparrow$	0	0	0
$\omega_2^{\#1} \uparrow$	0	0	0

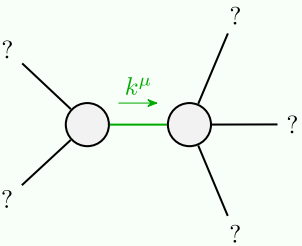
$\sigma_2^{\#1}$	$\tau_2^{\#1}$	$\sigma_2^{\#1}$	$\alpha\beta X$
$\sigma_2^{\#1} \uparrow$	$-\frac{2}{3k^2r_3}$	0	0
$\tau_2^{\#1} \uparrow$	0	0	0
$\omega_2^{\#1} \uparrow$	0	0	0

Source constraints		
SO(3) irreps	Fundamental fields	Multiplicities
$\tau_{0+}^{\#2} = 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} = 0$	1
$\tau_{0+}^{\#1} - 2 i k \sigma_{0+}^{\#1} = 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} = \partial_\beta \partial^\beta \tau_\alpha^\alpha + 2 \partial_\alpha \partial^\alpha \partial_\beta \sigma^{\alpha\beta}_\alpha$	1
$\tau_{1-}^{\#2\alpha} + 2 i k \sigma_{1-}^{\#2\alpha} = 0$	$\partial_\chi \partial_\beta \partial_\alpha \tau^{\alpha\beta\chi} = \partial_\chi \partial^\chi \partial_\beta \tau^{\alpha\beta} + 2 \partial_\delta \partial^\delta \partial_\chi \partial_\beta \sigma^{\alpha\beta\chi}$	3
$\tau_{1-}^{\#1\alpha} = 0$	$\partial_\chi \partial_\beta \partial_\alpha \tau^{\beta\chi} = \partial_\chi \partial^\chi \partial_\beta \tau^{\beta\alpha}$	3
$\tau_{1+}^{\#1\alpha\beta} + i k \sigma_{1+}^{\#2\alpha\beta} = 0$	$2 \partial_\delta \partial_\chi \partial_\alpha \sigma^{\beta\chi\delta} + \partial_\chi \partial^\beta \tau^{\chi\alpha} + \partial_\chi \partial^\chi \tau^{\alpha\beta} + \partial_\chi \partial^\alpha \tau^{\chi\beta} + \partial_\chi \partial^\beta \tau^{\alpha\chi} + \partial_\chi \partial^\chi \tau^{\beta\alpha} + 2 \partial_\delta \partial_\chi \partial^\beta \sigma^{\alpha\chi\delta}$	3
$\sigma_{2-}^{\#1\alpha\beta\chi} = 0$	$3 \partial_\delta \partial_\beta \partial^\chi \partial^\alpha \sigma^{\beta\delta\epsilon} + 3 \partial_\epsilon \partial^\epsilon \partial^\chi \partial^\alpha \sigma^{\beta\delta}_\delta + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\beta \sigma^{\alpha\chi\delta} + 4 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\beta \sigma^{\alpha\delta\chi} + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\beta \sigma^{\chi\delta\alpha} + 4 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\chi \sigma^{\alpha\beta\delta} + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\chi \sigma^{\alpha\delta\beta} + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\beta\chi\alpha} + 3 \eta^{\beta\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial^\alpha \sigma^{\delta\epsilon}_\delta + 3 \eta^{\alpha\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial_\delta \sigma^{\beta\delta\epsilon} + 3 \eta^{\beta\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial^\epsilon \sigma^{\alpha\delta}_\delta = 3 \partial_\delta \partial_\alpha \partial^\chi \partial^\beta \sigma^{\alpha\delta\epsilon} + 3 \partial_\epsilon \partial^\epsilon \partial^\chi \partial^\beta \sigma^{\alpha\delta}_\delta + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\beta\chi\delta} + 4 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\chi\delta\beta} + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\delta\beta\alpha} + 4 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\alpha\beta\chi} + 2 \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\alpha\chi\beta} + 3 \eta^{\alpha\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial^\beta \sigma^{\delta\epsilon}_\delta + 3 \eta^{\beta\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial_\delta \sigma^{\alpha\delta\epsilon} + 3 \eta^{\alpha\chi} \partial_\theta \partial^\theta \partial_\epsilon \partial^\beta \sigma^{\delta\delta}_\delta$	5
$\tau_{2+}^{\#1\alpha\beta} = 0$	$4 \partial_\delta \partial_\chi \partial^\beta \partial^\alpha \tau^{\chi\delta} + 2 \partial_\delta \partial^\delta \partial^\beta \partial^\alpha \tau_\chi^\chi + 3 \partial_\delta \partial^\delta \partial_\chi \partial^\chi \tau^{\alpha\beta} + 3 \partial_\delta \partial^\delta \partial_\chi \partial^\chi \tau^{\beta\alpha} + 2 \eta^{\alpha\beta} \partial_\epsilon \partial^\epsilon \partial_\delta \tau^{\chi\delta} = 3 \partial_\delta \partial^\delta \partial_\chi \partial^\alpha \tau^{\beta\chi} + 3 \partial_\delta \partial^\delta \partial_\chi \partial^\alpha \tau^{\chi\beta} + 3 \partial_\delta \partial^\delta \partial_\chi \partial^\beta \tau^{\alpha\chi} + 3 \partial_\delta \partial^\delta \partial_\chi \partial^\beta \tau^{\chi\alpha} + 2 \eta^{\alpha\beta} \partial_\epsilon \partial^\epsilon \partial_\delta \tau_\chi^\chi$	5
Total constraints/gauge generators:		21

$$\begin{aligned}
S = & \int \int \int \left(\frac{1}{6} (-4 t_3 \omega_{\alpha}^{\alpha} \omega_{\kappa}^{\kappa} + 6 f^{\alpha \beta} \tau_{\alpha \beta} + 6 \omega^{\alpha \beta \chi} \sigma_{\alpha \beta \chi} + 8 t_3 \omega_{\kappa}^{\kappa} \partial_{\kappa} f^{\alpha \iota} - \right. \\
& 8 t_3 \omega_{\iota}^{\kappa} \partial_{\kappa} f^{\alpha} + 4 t_3 \partial_{\iota} f^{\kappa} \partial_{\kappa} f^{\alpha} - 3 r_3 \partial_{\beta} \omega_{\iota}^{\theta} \partial_{\theta} \omega_{\alpha}^{\alpha \beta} - \\
& 3 r_3 \partial_{\iota} \omega_{\beta}^{\theta} \partial_{\theta} \omega_{\alpha}^{\alpha \beta} - 3 r_3 \partial_{\alpha} \omega^{\alpha \beta \iota} \partial_{\theta} \omega_{\beta}^{\theta} + \\
& 6 r_3 \partial_{\iota} \omega^{\alpha \beta} \partial_{\theta} \omega_{\beta}^{\theta} - 3 r_3 \partial_{\alpha} \omega^{\alpha \beta \iota} \partial_{\theta} \omega_{\iota}^{\theta} + \\
& 6 r_3 \partial_{\iota} \omega^{\alpha \beta} \partial_{\theta} \omega_{\alpha}^{\theta} + 4 t_2 \omega_{\iota \theta \alpha} \partial^{\theta} f^{\alpha \iota} + 2 t_2 \partial_{\alpha} f_{\iota \theta} \partial^{\theta} f^{\alpha \iota} - \\
& t_2 \partial_{\alpha} f_{\theta \iota} \partial^{\theta} f^{\alpha \iota} - t_2 \partial_{\iota} f_{\alpha \theta} \partial^{\theta} f^{\alpha \iota} + t_2 \partial_{\alpha} f_{\iota \theta} \partial^{\theta} f^{\alpha \iota} - \\
& t_2 \partial_{\theta} f_{\iota \alpha} \partial^{\theta} f^{\alpha \iota} - 4 t_2 \omega_{\alpha \theta \iota} (\omega^{\alpha \iota \theta} + \partial^{\theta} f^{\alpha \iota}) + \\
& 2 t_2 \omega_{\alpha \iota \theta} (\omega^{\alpha \iota \theta} + 2 \partial^{\theta} f^{\alpha \iota}) + 8 r_2 \partial_{\beta} \omega_{\alpha \iota \theta} \partial^{\theta} \omega^{\alpha \beta \iota} - \\
& 4 r_2 \partial_{\beta} \omega_{\alpha \theta \iota} \partial^{\theta} \omega^{\alpha \beta \iota} + 4 r_2 \partial_{\beta} \omega_{\iota \theta \alpha} \partial^{\theta} \omega^{\alpha \beta \iota} - \\
& 2 4 r_3 \partial_{\beta} \omega_{\iota \theta \alpha} \partial^{\theta} \omega^{\alpha \beta \iota} - 2 r_2 \partial_{\iota} \omega_{\alpha \beta \theta} \partial^{\theta} \omega^{\alpha \beta \iota} + \\
& 2 r_2 \partial_{\theta} \omega_{\alpha \beta \iota} \partial^{\theta} \omega^{\alpha \beta \iota} - 4 r_2 \partial_{\theta} \omega_{\alpha \iota \beta} \partial^{\theta} \omega^{\alpha \beta \iota} + \\
& 6 r_5 \partial_{\iota} \omega_{\theta}^{\kappa} \partial^{\theta} \omega_{\kappa}^{\alpha} - 6 r_5 \partial_{\theta} \omega_{\iota}^{\kappa} \partial^{\theta} \omega_{\kappa}^{\alpha} + \\
& 4 t_3 \partial_{\iota} f^{\alpha \iota} \partial_{\kappa} f^{\kappa} - 8 t_3 \partial_{\alpha} f^{\kappa} \partial_{\kappa} f^{\alpha} - 6 r_5 \partial_{\alpha} \omega^{\alpha \iota \theta} \partial_{\kappa} \omega_{\iota}^{\kappa} + \\
& 12 r_5 \partial^{\theta} \omega_{\alpha}^{\alpha} \partial_{\kappa} \omega_{\iota}^{\kappa} + 6 r_5 \partial_{\alpha} \omega^{\alpha \iota \theta} \partial_{\kappa} \omega_{\theta}^{\kappa} - \\
& \left. 12 r_5 \partial^{\theta} \omega_{\alpha}^{\alpha} \partial_{\kappa} \omega_{\theta}^{\kappa} \right) [t, x, y, z] d x d y d z d t
\end{aligned}$$

$\sigma_{1+}^{\#1} \alpha \beta$	$\sigma_{1+}^{\#2} \alpha \beta$	$\tau_{1+}^{\#1} \alpha \beta$	$\sigma_{1+}^{\#1} \alpha$	$\sigma_{1+}^{\#2} \alpha$	$\tau_{1+}^{\#1} \alpha$	$\tau_{1+}^{\#2} \alpha$
$\frac{1}{k^2(1+k^2)(2r_3+r_5)}$	$-\frac{\sqrt{2}}{k^2(1+k^2)(2r_3+r_5)}$	$-\frac{i\sqrt{2}}{k(1+k^2)(2r_3+r_5)}$	0	0	0	0
$-\frac{\sqrt{2}}{k^2(1+k^2)(2r_3+r_5)}$	$\frac{3k^2(2r_3+r_5)+2t_2}{(k+k^3)^2(2r_3+r_5)t_2}$	$\frac{i(3k^2(2r_3+r_5)+2t_2)}{k(1+k^2)^2(2r_3+r_5)t_2}$	0	0	0	0
$\frac{i\sqrt{2}}{k(1+k^2)(2r_3+r_5)}$	$-\frac{i(3k^2(2r_3+r_5)+2t_2)}{k(1+k^2)^2(2r_3+r_5)t_2}$	$\frac{3k^2(2r_3+r_5)+2t_2}{(1+k^2)^2(2r_3+r_5)t_2}$	0	0	0	0
0	0	0	$\frac{2}{k^2(r_3+2r_5)}$	$\frac{2\sqrt{2}}{k^2(1+2k^2)(r_3+2r_5)}$	0	$\frac{4i}{k(1+2k^2)(r_3+2r_5)}$
0	0	0	$\frac{2\sqrt{2}}{k^2(1+2k^2)(r_3+2r_5)}$	$\frac{3k^2(r_3+2r_5)+4t_3}{(k+2k^3)^2(r_3+2r_5)t_3}$	0	$\frac{i\sqrt{2}(3k^2(r_3+2r_5)+4t_3)}{k(1+2k^2)^2(r_3+2r_5)t_3}$
0	0	0	0	0	0	0
0	0	0	$-\frac{4i}{k(1+2k^2)(r_3+2r_5)}$	$-\frac{i\sqrt{2}(3k^2(r_3+2r_5)+4t_3)}{k(1+2k^2)^2(r_3+2r_5)t_3}$	0	$\frac{6k^2(r_3+2r_5)+8t_3}{(1+2k^2)^2(r_3+2r_5)t_3}$

Massive particle	
Pole residue:	$-\frac{1}{r_2} > 0$
Polarisations:	1
Square mass:	$-\frac{t_2}{r_2} > 0$
Spin:	0
Parity:	Odd



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

$$r_2 < 0 \& \& r_3 < 0 \& \& r_5 < -\frac{r_3}{2} \& \& t_2 > 0 \parallel r_2 < 0 \& \& r_3 < 0 \& \& r_5 > -2r_3 \& \& t_2 > 0 \parallel r_2 < 0 \& \& r_3 > 0 \& \& -2r_3 < r_5 < -\frac{r_3}{2} \& \& t_2 > 0$$