

Wave operator and propagator

$\sigma_{1+}^{\#1} + \alpha\beta$	$\sigma_{1+}^{\#1} + \alpha\beta$	$\sigma_{1+}^{\#2} + \alpha\beta$	$\tau_{1+}^{\#1} + \alpha\beta$	$\sigma_{1-}^{\#1} + \alpha$	$\sigma_{1-}^{\#2} + \alpha$	$\tau_{1-}^{\#1} + \alpha$	$\tau_{1-}^{\#2} + \alpha$
$\sigma_{1+}^{\#1} + \alpha\beta$	$\frac{1}{k^2 (2r_3-r_4)}$	$-\frac{\sqrt{2}}{k^2 (1+k^2) (2r_3-r_4)}$	$-\frac{i\sqrt{2}}{k (1+k^2) (2r_3-r_4)}$	0	0	0	0
$\sigma_{1+}^{\#2} + \alpha\beta$	$-\frac{\sqrt{2}}{k^2 (1+k^2) (2r_3-r_4)}$	$\frac{k^2 (6r_3-3r_4)+2t_2}{(k+k^3)^2 (2r_3-r_4) t_2}$	$\frac{i(k^2 (6r_3-3r_4)+2t_2)}{k (1+k^2)^2 (2r_3-r_4) t_2}$	0	0	0	0
$\tau_{1+}^{\#1} + \alpha\beta$	$\frac{i\sqrt{2}}{k (1+k^2) (2r_3-r_4)}$	$-\frac{i(k^2 (6r_3-3r_4)+2t_2)}{k (1+k^2)^2 (2r_3-r_4) t_2}$	$\frac{\frac{1}{r_3-\frac{r_4}{2}} + \frac{3k^2}{t_2}}{(1+k^2)^2}$	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

Quadratic (free) action

$$S = \int \int \int \int \left(\frac{1}{6} f^{\alpha\beta} \tau_{\alpha\beta} + 6 \omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + 4 t_2 \omega_{\iota\theta\alpha} \partial^\theta f^{\alpha\iota} + 2 t_2 \partial_\alpha f_{\iota\theta} \partial^\theta f^{\alpha\iota} - t_2 \partial_\alpha f_{\theta\iota} \partial^\theta f^{\alpha\iota} - \partial^\theta f^{\alpha\iota} - t_2 \partial_{\iota f} \partial^\theta f^{\alpha\iota} + t_2 \partial_{\theta f} \partial^\theta f^{\alpha\iota} - t_2 \partial_{\theta f} \partial^\theta f^{\alpha\iota} - 4 t_2 \omega_{\alpha\theta\iota} (\omega^{\alpha\iota\theta} + \partial^\theta f^{\alpha\iota}) + 2 t_2 \omega_{\alpha\iota\theta} (\omega^{\alpha\iota\theta} + 2 \partial^\theta f^{\alpha\iota}) + 8 r_2 \partial_\beta \omega_{\alpha\iota\theta} \partial^\theta \omega^{\alpha\beta\iota} - 4 r_2 \partial_\beta \omega_{\alpha\theta\iota} \partial^\theta \omega^{\alpha\beta\iota} + 4 r_2 \partial_\beta \omega_{\iota\theta\alpha} \partial^\theta \omega^{\alpha\beta\iota} - 2 r_2 \partial_{\iota} \omega_{\alpha\beta\theta} \partial^\theta \omega^{\alpha\beta\iota} + 2 r_2 \partial_{\theta} \omega_{\alpha\beta\iota} \partial^\theta \omega^{\alpha\beta\iota} - 4 r_2 \partial_{\theta} \omega_{\alpha\iota\beta} \partial^\theta \omega^{\alpha\beta\iota} - 12 r_4 \partial_{\theta} \omega_{\kappa\lambda} \partial^\kappa \omega^{\alpha\theta} - 12 r_4 \partial_\alpha \omega^{\alpha\theta\kappa} \partial_\lambda \omega_{\kappa\theta}^\lambda + 24 r_4 \partial^\kappa \omega^{\alpha\theta} \partial_\lambda \omega_{\kappa\theta}^\lambda - 24 r_3 \partial_\beta \omega_{\iota\lambda\alpha} \partial^\lambda \omega^{\alpha\beta\iota}) [t, x, y, z] dz dy dx dt$$

	$\omega_1^{\#1} + \alpha\beta$	$\omega_1^{\#2} + \alpha\beta$	$f_1^{\#1} + \alpha\beta$	$\omega_1^{\#1} - \alpha$	$\omega_1^{\#2} - \alpha$	$f_1^{\#1} - \alpha$	$f_1^{\#2} - \alpha$
$\omega_1^{\#1} + \alpha\beta$	$k^2(2r_3 - r_4) + \frac{2t_2}{3}$	$\frac{\sqrt{2}t_2}{3}$	$\frac{1}{3}i\sqrt{2}kt_2$	0	0	0	0
$\omega_1^{\#2} + \alpha\beta$	$\frac{\sqrt{2}t_2}{3}$	$\frac{t_2}{3}$	$\frac{ikt_2}{3}$	0	0	0	0
$f_1^{\#1} + \alpha\beta$	$-\frac{1}{3}i\sqrt{2}kt_2$	$-\frac{1}{3}ikt_2$	$\frac{k^2t_2}{3}$	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

Source constraints/gauge generators	SO(3) irreps	Multiplicities
	$\tau_{0+}^{\#2} == 0$	1
	$\tau_{0+}^{\#1} == 0$	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
	$\tau_{1+}^{\#1\alpha\beta} + i k \sigma_{1+}^{\#2\alpha\beta} == 0$	3
	$\sigma_2^{\#1\alpha\beta\chi} == 0$	5
	$\tau_{2+}^{\#1\alpha\beta} == 0$	5
	Total constraints:	27

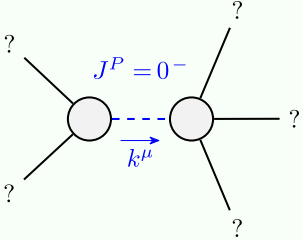
σ_0^{1+}	τ_0^{1+}	τ_0^{2+}	σ_0^{1-}
$\frac{1}{-2k^2r_3+4k^2r_4}$	0	0	0
0	0	0	0
0	0	0	0
0	0	0	$\frac{1}{k^2r_2+t_2}$

ω_0^{1+}	f_0^{1+}	f_0^{2+}	ω_0^{1-}
$-2k^2(r_3-2r_4)$	0	0	0
0	0	0	0
0	0	0	0
0	0	0	$k^2r_2+t_2$

σ_2^{1+}	τ_2^{1+}	τ_2^{2+}	σ_2^{1-}
$\frac{1}{k^2(-2r_3+r_4)}$	0	0	0
0	0	0	0
0	0	0	0

$\omega_+^{\#1} + \alpha\beta$	$k^2 - (2r_3 + r_4)$	$f_+^{\#1}$	$\omega_-^{\#1}$
$f_+^{\#1} + \alpha\beta$	0	0	0
$\omega_-^{\#1} + \alpha\beta\chi$	0	0	0

Massive and massless spectra



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

(No massless particles)

Unitarity conditions

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