

## Wave operator and propagator

	$\sigma_{1^+}^{\#1} \alpha \beta$	$\sigma_{1^+}^{\#2} \alpha \beta$	$\tau_{1^+}^{\#1} \alpha \beta$	$\sigma_{1^-}^{\#1} \alpha$	$\sigma_{1^-}^{\#2} \alpha$	$\tau_{1^-}^{\#1} \alpha$	$\tau_{1^-}^{\#2} \alpha$
$\sigma_{1^+}^{\#1} \uparrow \alpha \beta$	$\frac{1}{\frac{3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)}{16(\beta_1+2\beta_3)}+(a_2+a_5)k^2}$	$-\frac{2\sqrt{2}(3\alpha_0-4\beta_1+16\beta_3)}{(1+k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	$-\frac{2i\sqrt{2}(3\alpha_0-4\beta_1+16\beta_3)k}{(1+k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	0	0	0	0
$\sigma_{1^+}^{\#2} \uparrow \alpha \beta$	$-\frac{2\sqrt{2}(3\alpha_0-4\beta_1+16\beta_3)}{(1+k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	$\frac{6\alpha_0+8(\beta_1+8\beta_3+3(a_2+a_5)k^2)}{(1+k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	$\frac{2ik(3\alpha_0+4(\beta_1+8\beta_3+3(a_2+a_5)k^2))}{(1+k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	0	0	0	0
$\tau_{1^+}^{\#1} \uparrow \alpha \beta$	$\frac{2i\sqrt{2}(3\alpha_0-4\beta_1+16\beta_3)k}{(1+k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	$-\frac{2ik(3\alpha_0+4(\beta_1+8\beta_3+3(a_2+a_5)k^2))}{(1+k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	$-\frac{2k^2(3\alpha_0+4(\beta_1+8\beta_3+3(a_2+a_5)k^2))}{(1+k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+8\beta_3)+16(a_2+a_5)(\beta_1+2\beta_3)k^2)}$	0	0	0	0
$\sigma_{1^-}^{\#1} \uparrow \alpha$	0	0	0	$\frac{1}{\frac{3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)}{8(2\beta_1+\beta_2)}+(a_4+a_5)k^2}$	$\frac{2\sqrt{2}(3\alpha_0-4\beta_1+4\beta_2)}{(1+2k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$	0	$\frac{4i(3\alpha_0-4\beta_1+4\beta_2)k}{(1+2k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$
$\sigma_{1^-}^{\#2} \uparrow \alpha$	0	0	0	$\frac{2\sqrt{2}(3\alpha_0-4\beta_1+4\beta_2)}{(1+2k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$	$\frac{6\alpha_0+8(\beta_1+2\beta_2+3(a_4+a_5)k^2)}{(1+2k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$	0	$\frac{2i\sqrt{2}k(3\alpha_0+4(\beta_1+2\beta_2+3(a_4+a_5)k^2))}{(1+2k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$
$\tau_{1^-}^{\#1} \uparrow \alpha$	0	0	0	0	0	0	0
$\tau_{1^-}^{\#2} \uparrow \alpha$	0	0	0	$-\frac{4i(3\alpha_0-4\beta_1+4\beta_2)k}{(1+2k^2)(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$	$-\frac{2i\sqrt{2}k(3\alpha_0+4(\beta_1+2\beta_2+3(a_4+a_5)k^2))}{(1+2k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$	0	$\frac{4k^2(3\alpha_0+4(\beta_1+2\beta_2+3(a_4+a_5)k^2))}{(1+2k^2)^2(-3(\alpha_0-4\beta_1)(\alpha_0+2\beta_2)+8(a_4+a_5)(2\beta_1+\beta_2)k^2)}$

[illegible]

$\omega_0^{\#1} \vdash$	$-\frac{4\beta_2}{\omega_0^2+2\alpha_0\beta_2-4(\alpha_4+\alpha_6)\beta_2k^2}$	$\frac{i\sqrt{2}(\alpha_0+2\beta_2)}{-\alpha_0(\alpha_0+2\beta_2)k+4(\alpha_4+\alpha_6)\beta_2k^3}$	0	0
$\tau_0^{\#1} \vdash$	$\frac{i\sqrt{2}(\alpha_0+2\beta_2)}{\alpha_0(\alpha_0+2\beta_2)k+4(\alpha_4+\alpha_6)\beta_2k^3}$	$\frac{\alpha_0}{2}+\beta_2+(\alpha_4+\alpha_6)k^2$	0	0
$\tau_0^{\#2} \vdash$	0	0	0	0
$\omega_0^{\#1} \vdash$	0	0	0	$\frac{2}{\alpha_0+8\beta_3+2(\alpha_2+\alpha_3)k^2}$

$\omega_2^{\#1} \vdash \alpha\beta$	$-\frac{\alpha_0}{4}+\beta_1+(\alpha_1+\alpha_4)k^2$	$\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0	0
$f_2^{\#1} \vdash \alpha\beta$	$-\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	$2\beta_1k^2$	0	0
$\omega_2^{\#2} \vdash \alpha\beta\chi$	0	0	$-\frac{\alpha_0}{4}+\beta_1+(\alpha_1+\alpha_2)k^2$	

$\omega_0^{\#1} \vdash$	$\frac{\alpha_0}{2}+\beta_2+(\alpha_4+\alpha_6)k^2$	$-\frac{i(\alpha_0+2\beta_2)k}{\sqrt{2}}$	0	0
$f_0^{\#1} \vdash$	$\frac{i(\alpha_0+2\beta_2)k}{\sqrt{2}}$	$2\beta_2k^2$	0	0
$f_0^{\#2} \vdash$	0	0	0	0
$\omega_0^{\#1} \vdash$	0	0	$\frac{\alpha_0}{2}+4\beta_3+(\alpha_2+\alpha_3)k^2$	

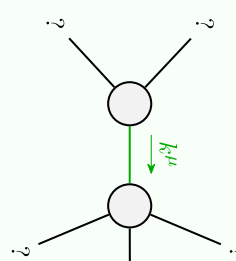
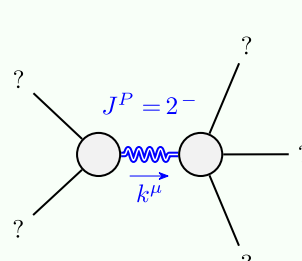
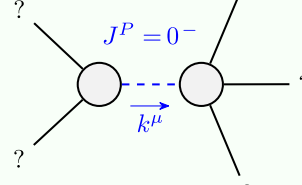
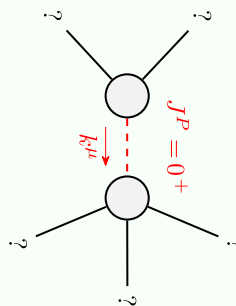
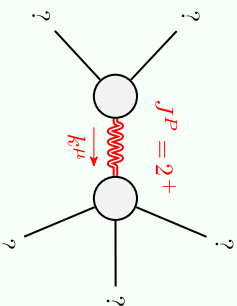
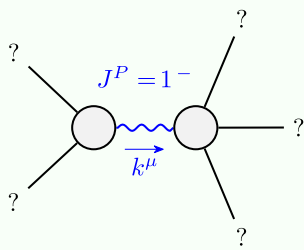
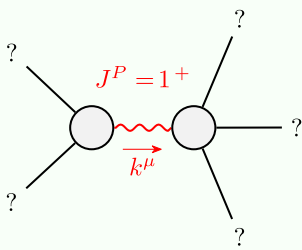
  

$\omega_2^{\#1} \vdash \alpha\beta$	$-\frac{\alpha_0}{2}+4\alpha_0\beta_1+16(\alpha_1+\alpha_4)\beta_1k^2$	$\frac{2i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k+16(\alpha_1+\alpha_4)\beta_1k^3}$	0	0
$\tau_2^{\#1} \vdash \alpha\beta$	$-\frac{2i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k+16(\alpha_1+\alpha_4)\beta_1k^3}$	$\frac{2(\alpha_0-4\beta_1+(\alpha_1+\alpha_4)k^2)}{k^2(\alpha_0^2-4\alpha_0\beta_1-16(\alpha_1+\alpha_4)\beta_1k^2)}$	0	0
$\omega_2^{\#2} \vdash \alpha\beta\chi$	0	0	$\frac{\alpha_0}{4}+\beta_1+(\alpha_1+\alpha_2)k^2$	

	$\omega_{1^1\alpha\beta}^{\#1}$	$\omega_{1^2\alpha\beta}^{\#2}$	$f_{1^1\alpha\beta}^{\#1}$	$\omega_{1^1\alpha}^{\#1}$	$\omega_{1^2\alpha}^{\#2}$	$f_{1^1\alpha}^{\#1}$	$f_{1^2\alpha}^{\#2}$
$\omega_{1^1\uparrow}^{\#1} + \alpha\beta$	$\frac{\alpha_0}{4} + \frac{1}{3}(\beta_1 + 8\beta_3) + (\alpha_2 + \alpha_5)k^2$	$\frac{3\alpha_0 - 4\beta_1 + 16\beta_3}{6\sqrt{2}}$	$\frac{i(3\alpha_0 - 4\beta_1 + 16\beta_3)k}{6\sqrt{2}}$	0	0	0	0
$\omega_{1^2\uparrow}^{\#2} + \alpha\beta$	$\frac{3\alpha_0 - 4\beta_1 + 16\beta_3}{6\sqrt{2}}$	$\frac{2}{3}(\beta_1 + 2\beta_3)$	$\frac{2}{3}i(\beta_1 + 2\beta_3)k$	0	0	0	0
$f_{1^1\uparrow}^{\#1} + \alpha\beta$	$-\frac{i(3\alpha_0 - 4\beta_1 + 16\beta_3)k}{6\sqrt{2}}$	$-\frac{2}{3}i(\beta_1 + 2\beta_3)k$	$\frac{2}{3}(\beta_1 + 2\beta_3)k^2$	0	0	0	0
$\omega_{1^1\uparrow}^{\#1} + \alpha$	0	0	0	$\frac{\alpha_0}{4} + \frac{1}{3}(\beta_1 + 2\beta_2) + (\alpha_4 + \alpha_5)k^2$	$-\frac{3\alpha_0 - 4\beta_1 + 4\beta_2}{6\sqrt{2}}$	0	$-\frac{1}{6}i(3\alpha_0 - 4\beta_1 + 4\beta_2)k$
$\omega_{1^2\uparrow}^{\#2} + \alpha$	0	0	0	$-\frac{3\alpha_0 - 4\beta_1 + 4\beta_2}{6\sqrt{2}}$	$\frac{1}{3}(2\beta_1 + \beta_2)$	0	$\frac{1}{3}i\sqrt{2}(2\beta_1 + \beta_2)k$
$f_{1^1\uparrow}^{\#1} + \alpha$	0	0	0	0	0	0	0
$f_{1^2\uparrow}^{\#2} + \alpha$	0	0	0	$\frac{1}{6}i(3\alpha_0 - 4\beta_1 + 4\beta_2)k$	$-\frac{1}{3}i\sqrt{2}(2\beta_1 + \beta_2)k$	0	$\frac{2}{3}(2\beta_1 + \beta_2)k^2$

Source constraints		
SO(3) irreps	Fundamental fields	Multiplicities
$\tau_0^{\#2} = 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} = 0$	1
$\tau_1^{\#2\alpha} + 2\,i\,k\,\sigma_1^{\#2\alpha} = 0$	$\partial_\chi \partial_\beta \partial^\alpha \tau^{\beta\chi} = \partial_\chi \partial_\beta \partial^\alpha \tau^{\alpha\beta} + 2\,\partial_\delta \partial^\delta \partial_\chi \partial_\beta \sigma^{\alpha\beta\chi}$	3
$\tau_1^{\#1\alpha} = 0$	$\partial_\chi \partial_\beta \partial^\alpha \tau^{\beta\chi} = \partial_\chi \partial^\alpha \partial_\beta \tau^{\beta\alpha}$	3
$\tau_1^{\#1\alpha} + i\,k\,\sigma_1^{\#2\alpha\beta} = 0$	$\partial_\chi \partial^\alpha \tau^{\beta\chi} + \partial_\chi \partial^\beta \tau^{\chi\alpha} + \partial_\chi \partial^\alpha \tau^{\chi\beta} +$ $2\,\partial_\delta \partial_\chi \partial^\alpha \sigma^{\beta\chi\delta} + 2\,\partial_\delta \partial^\delta \partial_\chi \sigma^{\alpha\beta\chi} =$ $\partial_\chi \partial^\alpha \tau^{\chi\beta} + \partial_\chi \partial^\beta \tau^{\alpha\chi} +$ $\partial_\chi \partial^\chi \tau^{\beta\alpha} + 2\,\partial_\delta \partial_\chi \partial^\beta \sigma^{\alpha\chi\delta}$	3
Total constraints/gauge generators:		10

## Massive and massless spectra



Massive particle	
Pole residue:	$\frac{(3(\alpha_0^2(3\alpha_2 + 3\alpha_5 + 2\beta_1 + 4\beta_3) - 8\alpha_0(\beta_1^2 + \alpha_2(\beta_1 - 4\beta_3) + \alpha_5(\beta_1 - 4\beta_3) - 4\beta_3^2) + 16(-4\beta_1\beta_3(\beta_1 + 2\beta_3) + \alpha_2(\beta_1^2 + 8\beta_3^2) + \alpha_5(\beta_1^2 + 8\beta_3^2))))}{(2(\alpha_2 + \alpha_5)(\beta_1 + 2\beta_3)(3\alpha_0^2 - 12\alpha_0(\beta_1 - 2\beta_3) + 16(\alpha_5\beta_1 + 2\alpha_5\beta_3 - 6\beta_1\beta_3 + \alpha_2(\beta_1 + 2\beta_3))))} > 0$
Polarisations:	3
Square mass:	$\frac{3(\alpha_0 - 4\beta_1)(\alpha_0 + 8\beta_3)}{16(\alpha_2 + \alpha_5)(\beta_1 + 2\beta_3)} > 0$
Spin:	1
Parity:	Even

Massive particle	
Pole residue:	$-( (3 (\alpha_0^2 (3 \alpha_4 + 3 \alpha_5 + 4 \beta_1 + 2 \beta_2) + 4 \alpha_0 (-2 \alpha_4 \beta_1 - 2 \alpha_5 \beta_1 - 4 \beta_1^2 + 2 \alpha_4 \beta_2 + 2 \alpha_5 \beta_2 + \beta_2^2) + 8 (-2 \beta_1 \beta_2 (2 \beta_1 + \beta_2) + \alpha_4 (2 \beta_1^2 + \beta_2^2) + \alpha_5 (2 \beta_1^2 + \beta_2^2)))) / (2 (\alpha_4 + \alpha_5) (2 \beta_1 + \beta_2) (3 \alpha_0^2 + 6 \alpha_0 (-2 \beta_1 + \beta_2) + 4 (2 \alpha_5 \beta_1 + \alpha_5 \beta_2 - 6 \beta_1 \beta_2 + \alpha_4 (2 \beta_1 + \beta_2)))) ) > 0$
Polarisations:	3
Square mass:	$\frac{3 (\alpha_0 - 4 \beta_1) (\alpha_0 + 2 \beta_2)}{8 (\alpha_4 + \alpha_5) (2 \beta_1 + \beta_2)} > 0$
Spin:	1
Parity:	Odd

Massive particle	
Pole residue:	$-\frac{2}{a_0} + \frac{a_1+a_4+2f_1}{2a_1\beta_1+2a_4\beta_1} > 0$
Polarisations:	5
Square mass:	$\frac{a_0(a_4g-4\beta_1)}{16(a_1+a_4)\beta_1} > 0$
Spin:	2
Parity:	Even

Massive particle	
Pole residue:	$\frac{1}{a} + \frac{q_4 + a q_6 + 2 \beta_2}{2 a_4 \beta_2 + 2 a_6 \beta_2} > 0$
Polarisations:	1
Square mass:	$\frac{q_0 (q_0 + 2 \beta_2)}{4 (a_4 + a_6) \beta_2} > 0$
Spin:	0
Parity:	Even

Massive particle	
Pole residue:	$-\frac{1}{a_2+a_3} > 0$
Polarisations:	1
Square mass:	$-\frac{a_0+8\beta_3}{2(a_2+a_3)} > 0$
Spin:	0
Parity:	Odd

Massive particle	
Pole residue:	$-\frac{1}{\alpha_1 + \alpha_2} > 0$
Polarisations:	5
Square mass:	$\frac{\alpha_0 - 4\beta_1}{4(\alpha_1 + \alpha_2)} > 0$
Spin:	2
Parity:	Odd

Quadratic pole	
Pole residue:	$\frac{1}{\alpha_0} > 0$
Polarisations:	2

## Unitarity conditions

(Unitarity is demonstrably impossible)