

Wave operator and propagator

$$\begin{aligned}
S = & \iiint \left(\frac{1}{4} (2 a_0 \Gamma_{\alpha}^{\alpha \beta} \Gamma_{\beta \chi}^{\chi} + 4 h^{\alpha \beta} \mathcal{T}_{\alpha \beta} + \alpha^{\beta \chi} (-2 a_0 \Gamma_{\beta \chi \alpha} + 4 \Delta_{\alpha \beta \chi}) - \right. \\
& a_0 h^{\chi} \partial_{\beta} \Gamma_{\alpha}^{\alpha \beta} + a_0 h^{\chi} \partial_{\beta} \Gamma_{\alpha}^{\alpha \beta} - 2 a_0 h_{\alpha \chi} \partial_{\beta} \Gamma^{\alpha \beta \chi} + \\
& 22 a_1 \partial^{\alpha} \Gamma^{\chi \delta} \partial_{\delta} \Gamma_{\chi \alpha}^{\beta} + 2 a_1 \partial^{\alpha} \Gamma_{\chi \alpha}^{\beta} \partial_{\beta} \Gamma^{\chi \delta} - \\
& 76 a_1 \partial^{\alpha} \Gamma^{\chi \delta} \chi \partial_{\beta} \Gamma_{\delta \alpha}^{\beta} + 2 a_0 h_{\beta \chi} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} - \\
& 2 a_1 \partial_{\beta} \Gamma_{\chi}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} - 2 a_1 \partial_{\beta} \Gamma_{\delta \chi}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} + \\
& 2 a_1 \partial_{\chi} \Gamma_{\beta}^{\delta} \partial^{\delta} \Gamma_{\alpha}^{\alpha \beta} - 2 a_1 \partial_{\chi} \Gamma_{\alpha}^{\delta} \partial_{\beta \delta}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} - \\
& 2 a_1 \partial_{\chi} \Gamma_{\delta \beta}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} - 22 a_1 \partial_{\beta} \Gamma_{\chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta} + \\
& 38 a_1 \partial_{\beta} \Gamma_{\chi \delta}^{\delta} \partial^{\chi} \Gamma^{\alpha \beta} + 22 a_1 \partial_{\chi} \Gamma_{\beta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta} - \\
& 2 a_1 \partial_{\chi} \Gamma_{\beta \delta}^{\delta} \partial^{\chi} \Gamma^{\alpha \beta} + 4 a_1 \partial_{\alpha} \Gamma_{\chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta} - \\
& 4 a_1 \partial_{\chi} \Gamma_{\alpha}^{\delta} \partial^{\chi} \Gamma^{\alpha \beta} - 2 a_1 \partial_{\chi} \Gamma^{\alpha \beta} \partial_{\delta} \Gamma_{\alpha \beta}^{\delta} - \\
& 2 a_1 \partial_{\beta} \Gamma^{\alpha \beta \chi} \partial_{\delta} \Gamma_{\alpha \chi}^{\delta} - 2 a_1 \partial_{\beta} \Gamma^{\alpha \beta \chi} \partial_{\delta} \Gamma_{\alpha \chi}^{\delta} + \\
& 38 a_1 \partial_{\chi} \Gamma^{\alpha \beta \chi} \partial_{\delta} \Gamma_{\beta \alpha}^{\delta} + 4 a_1 \partial^{\chi} \Gamma_{\alpha}^{\beta} \partial_{\delta} \Gamma_{\beta \chi}^{\delta} - \\
& 22 a_1 \partial^{\chi} \Gamma_{\beta \chi \alpha}^{\alpha \beta} \partial_{\delta} \Gamma_{\chi \alpha}^{\delta} + 2 a_1 \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} \partial_{\delta} \Gamma_{\chi \beta}^{\delta} - \\
& 2 a_1 \partial_{\beta} \Gamma^{\alpha \beta \chi} \partial_{\delta} \Gamma_{\chi}^{\delta} - 2 a_1 \partial^{\chi} \Gamma_{\beta}^{\alpha \beta} \partial_{\delta} \Gamma_{\chi}^{\delta} + \\
& 2 a_1 \partial^{\chi} \Gamma_{\beta \alpha}^{\beta} \partial_{\delta} \Gamma_{\chi}^{\delta \alpha} + 4 a_1 \partial^{\chi} \Gamma_{\alpha}^{\beta} \partial_{\delta} \Gamma_{\chi}^{\delta \beta} - \\
& 2 a_1 \partial_{\beta} \Gamma_{\alpha}^{\alpha \beta} \partial_{\delta} \Gamma_{\chi}^{\delta} + 4 a_1 \partial_{\beta} \Gamma_{\alpha}^{\alpha \beta} \partial_{\delta} \Gamma^{\chi \delta} - \\
& 2 a_1 \partial_{\beta} \Gamma_{\alpha}^{\alpha \beta} \partial_{\delta} \Gamma_{\chi}^{\delta} + 2 a_1 \partial_{\alpha} \Gamma_{\beta \chi \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + \\
& 4 a_1 \partial_{\alpha} \Gamma_{\beta \chi \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\chi \beta \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + \\
& 2 a_1 \partial_{\alpha} \Gamma_{\chi \delta \beta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\delta \beta \chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + \\
& 4 a_1 \partial_{\alpha} \Gamma_{\delta \chi \beta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\beta} \Gamma_{\alpha \chi \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - \\
& 2 a_1 \partial_{\beta} \Gamma_{\alpha \delta \chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\beta} \Gamma_{\chi \delta \alpha}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - \\
& 2 a_1 \partial_{\chi} \Gamma_{\alpha \beta \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\chi} \Gamma_{\beta \alpha \delta}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + \\
& 4 a_1 \partial_{\chi} \Gamma_{\beta \delta \alpha}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 4 a_1 \partial_{\delta} \Gamma_{\alpha \beta \chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 4 a_1 \partial_{\delta} \Gamma_{\alpha \chi \beta}^{\delta} \\
& \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\delta} \Gamma_{\beta \alpha \chi}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\delta} \Gamma_{\beta \chi \alpha}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} - \\
& 2 a_1 \partial_{\delta} \Gamma_{\chi \beta \alpha}^{\delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 2 a_1 \partial_{\beta} \Gamma_{\delta \alpha}^{\beta} \partial^{\delta} \Gamma^{\alpha \chi} + \\
& 2 a_1 \partial_{\beta} \Gamma_{\delta \alpha}^{\beta} \partial^{\delta} \Gamma_{\chi}^{\alpha}) [t, x, y, z] dz dy dx dt
\end{aligned}$$

	$\Delta_0^{\#1}$	$\Delta_0^{\#2}$	$\Delta_0^{\#3}$	$\Delta_0^{\#4}$	$\mathcal{T}_0^{\#1}$	$\mathcal{T}_0^{\#2}$	$\Delta_0^{\#1}$
$\Delta_0^{\#1} \dagger$	0	$\frac{4\sqrt{6}}{16a_0+3a_0k^2}$	$-\frac{4\sqrt{\frac{2}{3}}}{16a_0+3a_0k^2}$	$-\frac{8}{\sqrt{3}(16a_0+3a_0k^2)}$	$\frac{2i\sqrt{2}}{a_0k}$	$-\frac{2i\sqrt{6}k}{16a_0+3a_0k^2}$	0
$\Delta_0^{\#2} \dagger$	$\frac{4\sqrt{6}}{16a_0+3a_0k^2}$	$-\frac{48(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	$\frac{16(19a_0+(3a_0+197a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{8\sqrt{2}(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{8i\sqrt{3}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$\frac{24ik(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	0
$\Delta_0^{\#3} \dagger$	$-\frac{4\sqrt{\frac{2}{3}}}{16a_0+3a_0k^2}$	$\frac{16(19a_0+(3a_0+197a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{16(35a_0+(6a_0+197a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$-\frac{8\sqrt{2}(22a_0+(3a_0+394a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$\frac{8i(a_0-65a_1k^2)}{\sqrt{3}a_0^2k(16+3k^2)}$	$-\frac{8ik(19a_0+(3a_0+197a_1)k^2)}{a_0^2(16+3k^2)^2}$	0
$\Delta_0^{\#4} \dagger$	$-\frac{8}{\sqrt{3}(16a_0+3a_0k^2)}$	$-\frac{8\sqrt{2}(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{8\sqrt{2}(22a_0+(3a_0+394a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$\frac{32(13a_0+(3a_0-197a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$\frac{8i\sqrt{\frac{2}{3}}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$\frac{4i\sqrt{2}k(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	0
$\mathcal{T}_0^{\#1} \dagger$	$\frac{2i\sqrt{2}}{a_0k}$	$\frac{8i\sqrt{3}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$-\frac{8i(a_0-65a_1k^2)}{\sqrt{3}a_0^2k(16+3k^2)}$	$-\frac{8i\sqrt{\frac{2}{3}}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$\frac{4(a_0-25a_1k^2)}{a_0^2k^2}$	$\frac{4\sqrt{3}(a_0-65a_1k^2)}{a_0^2(16+3k^2)}$	0
$\mathcal{T}_0^{\#2} \dagger$	$\frac{2i\sqrt{6}k}{16a_0+3a_0k^2}$	$-\frac{24ik(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	$\frac{8ik(19a_0+(3a_0+197a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{4i\sqrt{2}k(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	$\frac{4\sqrt{3}(a_0-65a_1k^2)}{a_0^2(16+3k^2)}$	$-\frac{12k^2(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	0
$\Delta_0^{\#1} \ddagger$	0	0	0	0	0	0	$-\frac{2}{a_0a_1k^2}$

	$\Gamma_{0+}^{\#1}$	$\Gamma_{0+}^{\#2}$	$\Gamma_{0+}^{\#3}$	$\Gamma_{0+}^{\#4}$	$h_{0+}^{\#1}$	$h_{0+}^{\#2}$	$\Gamma_{0-}^{\#1}$
$\Gamma_{0+}^{\#1} \dagger$	$\frac{1}{2}(-a_0 + 25a_1k^2)$	0	$10\sqrt{\frac{2}{3}}a_1k^2$	$-\frac{10a_1k^2}{\sqrt{3}}$	$-\frac{ia_0k}{2\sqrt{2}}$	0	0
$\Gamma_{0+}^{\#2} \dagger$	0	0	$\frac{a_0}{2}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0
$\Gamma_{0+}^{\#3} \dagger$	$10\sqrt{\frac{2}{3}}a_1k^2$	$\frac{a_0}{2}$	$\frac{23a_1k^2}{3}$	$-\frac{3a_0+46a_1k^2}{6\sqrt{2}}$	$\frac{ia_0k}{4\sqrt{3}}$	$-\frac{1}{4}ia_0k$	0
$\Gamma_{0+}^{\#4} \dagger$	$-\frac{10a_1k^2}{\sqrt{3}}$	$-\frac{a_0}{2\sqrt{2}}$	$-\frac{3a_0+46a_1k^2}{6\sqrt{2}}$	$\frac{1}{6}(3a_0+23a_1k^2)$	$-\frac{ia_0k}{4\sqrt{6}}$	$\frac{ia_0k}{4\sqrt{2}}$	0
$h_{0+}^{\#1} \dagger$	$\frac{ia_0k}{2\sqrt{2}}$	0	$-\frac{ia_0k}{4\sqrt{3}}$	$\frac{ia_0k}{4\sqrt{6}}$	0	0	0
$h_{0+}^{\#2} \dagger$	0	0	$\frac{ia_0k}{4}$	$-\frac{ia_0k}{4\sqrt{2}}$	0	0	0
$\Gamma_{0-}^{\#1} \dagger$	0	0	0	0	0	0	$\frac{1}{2}(-a_0+a_1k^2)$

$$\Delta_{3^{-}}^{\#1} + \alpha\beta X \quad \Delta_{3^{-}}^{\#1} - \alpha\beta X$$

Source constraints		
SO(3) irreps	Fundamental fields	Multiplicities
$2\mathcal{T}_{0^2}^{\#2} - i k \Delta_{0^2}^{\#2} == 0$	$2\partial_\beta\partial_\alpha\mathcal{T}^{\alpha\beta} == \partial_\chi\partial_\beta\partial_\alpha\Delta^{\alpha\beta\chi}$	1
$\Delta_{0^+}^{\#3} + 2\Delta_{0^+}^{\#4} + 3\Delta_{0^+}^{\#2} == 0$	$\partial_\alpha\Delta^{\alpha\beta}{}_\beta == 0$	1
$6\mathcal{T}_1^{\#1\alpha} - i k (3\Delta_1^{\#2\alpha} - \Delta_1^{\#5\alpha} + \Delta_1^{\#3\alpha}) == 0$	$2\partial_\chi\partial_\beta\partial_\alpha\mathcal{T}^{\beta\chi} + \partial_\sigma\partial^\sigma\partial_\chi\partial_\beta\Delta^{\beta\alpha\chi} == 2\partial_\chi\partial_\beta\partial_\sigma\mathcal{T}^{\sigma\alpha\beta} + \partial_\sigma\partial_\chi\partial_\beta\partial^\sigma\Delta^{\beta\alpha\chi}$	3
$2\Delta_1^{\#6\alpha} + \Delta_1^{\#4\alpha} + 2\Delta_1^{\#5\alpha} + \Delta_1^{\#3\alpha} == 0$	$\partial_\beta\partial^\alpha\Delta^{\beta\chi}{}_\chi == \partial_\chi\partial^\chi\Delta^{\alpha\beta}{}_\beta$	3
Total constraints/gauge generators:		8