

Massive and massless spectra



$a_0 < 0$

$$\begin{array}{cc} \Delta_3^{\#1} + \alpha\beta\chi & \Delta_3^{\#1} - \alpha\beta\chi \\ \boxed{-\frac{2}{a_0}} & \boxed{-\frac{a_0}{2}} \end{array}$$

	$\Gamma_{2^+ \alpha\beta}^{\#1}$	$\Gamma_{2^+ \alpha\beta}^{\#2}$	$\Gamma_{2^+ \alpha\beta}^{\#3}$	$h_{2^+ \alpha\beta}^{\#1}$	$\Gamma_{2^- \alpha\beta\chi}^{\#1}$	$\Gamma_{2^- \alpha\beta\chi}^{\#2}$
$\Gamma_{2^+}^{\#1} \uparrow \alpha\beta$	$\frac{a_0}{4}$	0	0	$\frac{i a_0 k}{4 \sqrt{2}}$	0	0
$\Gamma_{2^+}^{\#2} \uparrow \alpha\beta$	0	$-\frac{a_0}{2}$	0	$\frac{i a_0 k}{4 \sqrt{3}}$	0	0
$\Gamma_{2^+}^{\#3} \uparrow \alpha\beta$	0	0	$\frac{a_0}{4}$	$-\frac{i a_0 k}{4 \sqrt{6}}$	0	0
$h_{2^+}^{\#1} \uparrow \alpha\beta$	$-\frac{i a_0 k}{4 \sqrt{2}}$	$-\frac{i a_0 k}{4 \sqrt{3}}$	$\frac{i a_0 k}{4 \sqrt{6}}$	0	0	0
$\Gamma_{2^-}^{\#1} \uparrow \alpha\beta\chi$	0	0	0	0	$\frac{a_0}{4}$	0
$\Gamma_{2^-}^{\#2} \uparrow \alpha\beta\chi$	0	0	0	0	0	$\frac{a_0}{4}$

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

	$\Delta_{2^+}^{\#1} \dagger \alpha\beta$	$\Delta_{2^+}^{\#2} \dagger \alpha\beta$	$\Delta_{2^+}^{\#3} \dagger \alpha\beta$	$\mathcal{T}_{2^+}^{\#1} \dagger \alpha\beta$	$\Delta_{2^+}^{\#1} \dagger \alpha\beta_X$	$\Delta_{2^+}^{\#2} \dagger \alpha\beta_X$
$\Delta_{2^+}^{\#1} \dagger \alpha\beta$	0	$\frac{2\sqrt{\frac{2}{3}}}{a_0}$	$\frac{4}{\sqrt{3}a_0}$	$\frac{4i\sqrt{2}}{a_0k}$	0	0
$\Delta_{2^+}^{\#2} \dagger \alpha\beta$	$\frac{2\sqrt{\frac{2}{3}}}{a_0}$	$-\frac{8}{3a_0}$	$-\frac{2\sqrt{2}}{3a_0}$	$-\frac{4i}{\sqrt{3}a_0k}$	0	0
$\Delta_{2^+}^{\#3} \dagger \alpha\beta$	$\frac{4}{\sqrt{3}a_0}$	$-\frac{2\sqrt{2}}{3a_0}$	$\frac{8}{3a_0}$	$-\frac{4i\sqrt{\frac{2}{3}}}{a_0k}$	0	0
$\mathcal{T}_{2^+}^{\#1} \dagger \alpha\beta$	$-\frac{4i\sqrt{2}}{a_0k}$	$\frac{4i}{\sqrt{3}a_0k}$	$\frac{4i\sqrt{\frac{2}{3}}}{a_0k}$	$-\frac{8}{a_0k^2}$	0	0
$\Delta_{2^+}^{\#1} \dagger \alpha\beta_X$	0	0	0	0	$\frac{4}{a_0}$	0
$\Delta_{2^+}^{\#2} \dagger \alpha\beta_X$	0	0	0	0	0	$\frac{4}{a_0}$

Source constraints	Fundamental fields	Multiplicities
$SO(3)$ irreps		
$2 \mathcal{T}_0^{\#1} - i k \Delta_0^{\#2} = 0$	$2 \partial_\beta \partial_\alpha \mathcal{T}^{\alpha\beta} = \partial_\chi \partial_\beta \partial_\alpha \Delta^{\alpha\beta\chi}$	1
$\Delta_0^{\#3} + 2 \Delta_0^{\#4} + 3 \Delta_0^{\#2} = 0$	$\partial_\alpha \Delta^{\alpha\beta}{}_\beta = 0$	1
$6 \mathcal{T}_1^{\#1\alpha} - i k (3 \Delta_1^{\#2\alpha} - \Delta_1^{\#5\alpha} + \Delta_1^{\#3\alpha}) = 0$	$2 \partial_\chi \partial_\beta \partial^\alpha \mathcal{T}^{\beta\chi} + \partial_\sigma \partial^\sigma \partial_\chi \partial_\beta \Delta^{\beta\alpha\chi} = 2 \partial_\chi \partial^\chi \partial_\beta \mathcal{T}^{\alpha\beta} + \partial_\sigma \partial_\chi \partial_\beta \partial^\alpha \Delta^{\beta\chi\sigma}$	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