Particle spectrograph

Wave operator and propagator

	$\Delta_{1}^{\#1}{}_{lphaeta}$	$\Delta_{1}^{\#2}{}_{lphaeta}$	$\Delta_{1}^{\#3}{}_{lphaeta}$	$\Delta_{1}^{#1}{}_{lpha}$	$\Delta_{1}^{\#2}{}_{lpha}$	$\Delta_{1}^{\#3}{}_{lpha}$	$\Delta_1^{\#4}{}_{lpha}$	$\Delta_{1}^{\#5}{}_{lpha}$	$\Delta_{1^{-}\alpha}^{\#6}$	${\mathcal T}_1^{\# 1}{}_{lpha}$
$\Delta_{1}^{\#1} \dagger^{\alpha\beta}$	0	$-\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0	0	0	0
$\Delta_{1}^{#2} \dagger^{\alpha\beta}$	$-\frac{2\sqrt{2}}{a_0}$	$\frac{2 (a_0^2 - 14 a_0 a_1 k^2 - 35 a_1^2 k^4)}{a_0^2 (a_0 - 29 a_1 k^2)}$	$\frac{40\sqrt{2}a_1k^2}{a_0^2-29a_0a_1k^2}$	0	0	0	0	0	0	0
$\Delta_{1}^{#3} \dagger^{\alpha\beta}$	0	$\frac{40\sqrt{2} a_1 k^2}{a_0^2 - 29 a_0 a_1 k^2}$	$\frac{4}{a_0-29a_1k^2}$	0	0	0	0	0	0	0
$\Delta_{1}^{#1}\dagger^{\alpha}$	0	0	0	0	$\frac{\sqrt{2} (4+k^2)}{a_0 (2+k^2)}$	$-\frac{2 k^2}{\sqrt{3} a_0 (2+k^2)}$	0	$\frac{\sqrt{\frac{2}{3}} k^2}{a_0 (2+k^2)}$	0	$-\frac{2i\sqrt{2}k}{a_0(2+k^2)}$
$\Delta_1^{#2} \dagger^{\alpha}$	0	0	0	$\frac{\sqrt{2} (4+k^2)}{a_0 (2+k^2)}$	$\frac{a_0^2 (4+k^2)^2 - 30 a_0 a_1 k^2 (4+k^2) (4+3 k^2) + a_1^2 k^4 (6416+7928 k^2+1901 k^4)}{2 a_0^2 (2+k^2)^2 (a_0-33 a_1 k^2)}$	$\frac{k^2 (a_0^2 (-2+k^2) + a_0 a_1 (560 + 302 k^2 + 71 k^4) - 2 a_1^2 k^2 (9440 + 1901 k^2 (4+k^2)))}{2 \sqrt{6} a_0^2 (2+k^2)^2 (a_0-33 a_1 k^2)}$	$-\frac{\sqrt{\frac{5}{6}} k^2 (a_0+a_1 (40-31 k^2))}{2 a_0 (2+k^2) (a_0-33 a_1 k^2)}$	$\frac{k^2 (2 a_0^2 (5 + 2 k^2) - a_0 a_1 (880 + 778 k^2 + 199 k^4) + a_1^2 k^2 (9440 + 1901 k^2 (4 + k^2)))}{2 \sqrt{3} a_0^2 (2 + k^2)^2 (a_0 - 33 a_1 k^2)}$	$\frac{k^2 \left(-a_0 + a_1 \left(200 + 43 k^2\right)\right)}{\sqrt{6} a_0 \left(2 + k^2\right) \left(a_0 - 33 a_1 k^2\right)}$	$-\frac{i k (-30 a_0 a_1 k^4 + a_0^2 (4 + k^2) + 27 a_1^2 k^4 (-28 + 3 k^2))}{a_0^2 (2 + k^2)^2 (a_0 - 33 a_1 k^2)}$
$\Delta_1^{#3} \uparrow^{\alpha}$	0	0	0	$-\frac{2k^2}{\sqrt{3}(2a_0+a_0k^2)}$	$\frac{k^2 (a_0^2 (-2+k^2) + a_0 a_1 (560 + 302 k^2 + 71 k^4) - 2 a_1^2 k^2 (9440 + 1901 k^2 (4+k^2)))}{2 \sqrt{6} a_0^2 (2+k^2)^2 (a_0 - 33 a_1 k^2)} - a_0^2 (2+k^2)^2 (a_0^2 - 33 a_1 k^2)$	$\frac{a_0^2 (76+52 k^2+3 k^4)+4 a_0 a_1 k^2 (472+214 k^2+19 k^4)+4 a_1^2 k^4 (5120+7280 k^2+1901 k^4)}{12 a_0^2 (2+k^2)^2 (a_0-33 a_1 k^2)}$	$\frac{\sqrt{5} (10 a_0 + (3 a_0 - 328 a_1) k^2 - 62 a_1 k^4)}{12 a_0 (2 + k^2) (a_0 - 33 a_1 k^2)}$	$\frac{2a_0^2 (-2+k^2) + a_0 a_1 k^2 (472 + 934 k^2 + 289 k^4) - 2a_1^2 k^4 (5120 + 7280 k^2 + 1901 k^4)}{6 \sqrt{2} a_0^2 (2+k^2)^2 (a_0 - 33 a_1 k^2)}$	$-\frac{2 a_0 + (3 a_0 - 56 a_1) k^2 + 86 a_1 k^4}{6 a_0 (2 + k^2) (a_0 - 33 a_1 k^2)}$	$\frac{i k (54 a_1^2 k^4 (40 + 3 k^2) + a_0^2 (6 + 5 k^2) - 3 a_0 a_1 k^2 (86 + 23 k^2))}{\sqrt{6} a_0^2 (2 + k^2)^2 (a_0 - 33 a_1 k^2)}$
$\Delta_{1}^{\#4} \uparrow^{\alpha}$	0	0	0	0	$-\frac{\sqrt{\frac{5}{6}} k^2 (a_0+a_1 (40-31 k^2))}{2 a_0 (2+k^2) (a_0-33 a_1 k^2)}$	$\frac{\sqrt{5} (10 a_0 + k^2 (3 a_0 - 2 a_1 (164 + 31 k^2)))}{12 a_0 (2 + k^2) (a_0 - 33 a_1 k^2)}$	$\frac{1}{12 a_0 - 396 a_1 k^2}$	$\frac{\sqrt{\frac{5}{2}} \left(-2 a_0 + a_1 k^2 \left(164 + 31 k^2\right)\right)}{6 a_0 \left(2 + k^2\right) \left(a_0 - 33 a_1 k^2\right)}$	$-\frac{\sqrt{5}}{6(a_0-33a_1k^2)}$	$-\frac{i\sqrt{\frac{5}{6}} k(a_0-51a_1k^2)}{a_0(2+k^2)(a_0-33a_1k^2)}$
$\Delta_1^{\#5} \uparrow^{\alpha}$	0	0	0	$\frac{\sqrt{\frac{2}{3}} k^2}{2 a_0 + a_0 k^2}$	$\frac{k^2 \left(2 a_0^2 \left(5+2 k^2\right)-a_0 a_1 \left(880+778 k^2+199 k^4\right)+a_1^2 k^2 \left(9440+1901 k^2 \left(4+k^2\right)\right)\right)}{2 \sqrt{3} a_0^2 \left(2+k^2\right)^2 \left(a_0-33 a_1 k^2\right)}$	$\frac{2 a_0^2 (-2+k^2) + a_0 a_1 k^2 (472 + 934 k^2 + 289 k^4) - 2 a_1^2 k^4 (5120 + 7280 k^2 + 1901 k^4)}{6 \sqrt{2} a_0^2 (2+k^2)^2 (a_0 - 33 a_1 k^2)}$	$\frac{\sqrt{\frac{5}{2}} \left(-2 a_0 + a_1 k^2 \left(164 + 31 k^2\right)\right)}{6 a_0 \left(2 + k^2\right) \left(a_0 - 33 a_1 k^2\right)}$	$\frac{4a_0^2(17+14k^2+3k^4)-4a_0a_1k^2(236+287k^2+77k^4)+a_1^2k^4(5120+7280k^2+1901k^4)}{6a_0^2(2+k^2)^2(a_0-33a_1k^2)}$	$-\frac{a_1 k^2 (28-43 k^2)+2 a_0 (7+3 k^2)}{3 \sqrt{2} a_0 (2+k^2) (a_0-33 a_1 k^2)}$	$\frac{i k (2 a_0^2 (3+k^2)-27 a_1^2 k^4 (40+3 k^2)+3 a_0 a_1 k^2 (34+7 k^2))}{\sqrt{3} a_0^2 (2+k^2)^2 (a_0-33 a_1 k^2)}$
$\Delta_1^{\#6} \uparrow^{\alpha}$	0	0	0	0	$\frac{k^2 \left(-a_0 + a_1 \left(200 + 43 k^2\right)\right)}{\sqrt{6} \ a_0 \left(2 + k^2\right) \left(a_0 - 33 a_1 k^2\right)}$	$-\frac{2 a_0 + (3 a_0 - 56 a_1) k^2 + 86 a_1 k^4}{6 a_0 (2 + k^2) (a_0 - 33 a_1 k^2)}$	$-\frac{\sqrt{5}}{6(a_0-33a_1k^2)}$	$-\frac{a_1 k^2 (28-43 k^2)+2 a_0 (7+3 k^2)}{3 \sqrt{2} a_0 (2+k^2) (a_0-33 a_1 k^2)}$	$\frac{5}{3(a_0-33a_1k^2)}$	$-\frac{i\sqrt{\frac{2}{3}}k(a_0+57a_1k^2)}{a_0(2+k^2)(a_0-33a_1k^2)}$
$\mathcal{T}_{1}^{#1}\dagger^{\alpha}$	0	0	0	$\frac{2i\sqrt{2}k}{2a_0+a_0k^2}$	$\frac{i(-30a_0a_1k^5 + a_0^2k(4+k^2) + 27a_1^2k^5(-28+3k^2))}{a_0^2(2+k^2)^2(a_0-33a_1k^2)}$	$-\frac{i\left(54 a_{1}^{2} k^{5} \left(40+3 k^{2}\right)+a_{0}^{2} k \left(6+5 k^{2}\right)-3 a_{0} a_{1} k^{3} \left(86+23 k^{2}\right)\right)}{\sqrt{6} a_{0}^{2} \left(2+k^{2}\right)^{2} \left(a_{0}-33 a_{1} k^{2}\right)}$	$\frac{i\sqrt{\frac{5}{6}}k(a_0-51a_1k^2)}{a_0(2+k^2)(a_0-33a_1k^2)}$	$-\frac{i(2a_0^2k(3+k^2)-27a_1^2k^5(40+3k^2)+3a_0a_1k^3(34+7k^2))}{\sqrt{3}a_0^2(2+k^2)^2(a_0-33a_1k^2)}$	$\frac{i\sqrt{\frac{2}{3}}k(a_0+57a_1k^2)}{a_0(2+k^2)(a_0-33a_1k^2)}$	$\frac{2 k^2 (a_0^2 + 30 a_0 a_1 k^2 - 459 a_1^2 k^4)}{a_0^2 (2 + k^2)^2 (a_0 - 33 a_1 k^2)}$

	_	$\Gamma_{1}^{\#1}{}_{lphaeta}$	$\Gamma_{1}^{#2} \alpha \beta$	$\Gamma_{1}^{\#3}{}_{lphaeta}$	$\Gamma_{1}^{\#1}{}_{\alpha}$	$\Gamma_{1}^{\#2}\alpha$	Γ ₁ - α	$\Gamma_{1}^{\#4}$	Γ ₁ ^{±5} α	$\Gamma_{1}^{\#6}{}_{lpha}$	$h_{1}^{\#1}\alpha$
$\Gamma_{1}^{\#1}$	$^{\perp}$ $^{+\alpha\beta}$	$\frac{1}{4} \left(-a_0 - 15 a_1 k^2 \right)$	$-\frac{a_0}{2\sqrt{2}}$	$5a_1k^2$	0	0	0	0	0	0	0
Γ ₁ +	$\frac{2}{3}$ † $\frac{\alpha\beta}{2}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0	0	0	0
Γ ₁ +3	$\frac{3}{2} + \frac{\alpha\beta}{2}$	$5 a_1 k^2$	0	$\frac{1}{4}(a_0-29a_1k^2)$	0	0	0	0	0	0	0
Γ ₁ #	^{‡1} † ^α	0	0	0	$\frac{1}{4} \left(-a_0 - 3 a_1 k^2 \right)$	$\frac{a_0}{2\sqrt{2}}$	$\frac{5}{2} \sqrt{3} a_1 k^2$	$-\frac{5}{2} \sqrt{\frac{5}{3}} a_1 k^2$	$5\sqrt{\frac{3}{2}}a_1k^2$	$-\frac{5a_1k^2}{\sqrt{3}}$	$-\frac{i a_0 k}{4 \sqrt{2}}$
Γ ₁	$\frac{1}{2} + \alpha$	0	0	0	$\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0
Γ ₁ #	± ³ † ^α	0	0	0	$\frac{5}{2} \sqrt{3} a_1 k^2$	0	- <u>a₀</u> 3	$\frac{1}{6} \sqrt{5} (a_0 - 8 a_1 k^2)$	$-\frac{a_0}{6\sqrt{2}}$	$\frac{1}{6} \left(-a_0 + 20 a_1 k^2 \right)$	$\frac{i a_0 k}{4 \sqrt{6}}$
Γ ₁ #	±4 †α	0	0	0	$-\frac{5}{2} \sqrt{\frac{5}{3}} a_1 k^2$	0	$\frac{1}{6} \sqrt{5} (a_0 - 8 a_1 k^2)$	$\frac{1}{3} (a_0 + 7 a_1 k^2)$	$-\frac{1}{6} \sqrt{\frac{5}{2}} (a_0 + 16 a_1 k^2)$	$-\frac{1}{6}\sqrt{5}(a_0-5a_1k^2)$	$-\frac{1}{4}\bar{l}\sqrt{\frac{5}{6}}a_0k$
Γ ₁ #	^{±5} † ^α	0	0	0	$5\sqrt{\frac{3}{2}}a_1k^2$	0	$-\frac{a_0}{6\sqrt{2}}$	$-\frac{1}{6} \sqrt{\frac{5}{2}} (a_0 + 16 a_1 k^2)$	<u>a₀</u> 3	$\frac{a_0 + 40 a_1 k^2}{6 \sqrt{2}}$	$\frac{i a_0 k}{4 \sqrt{3}}$
Γ ₁ #	^{±6} † ^α	0	0	0	$-\frac{5a_1k^2}{\sqrt{3}}$	0	$\frac{1}{6} \left(-a_0 + 20 a_1 k^2 \right)$	$-\frac{1}{6}\sqrt{5}(a_0-5a_1k^2)$	$\frac{a_0 + 40 a_1 k^2}{6 \sqrt{2}}$	$\frac{5}{12}$ $(a_0 - 17 a_1 k^2)$	$\frac{i a_0 k}{4 \sqrt{6}}$
$h_1^{\#}$	^{‡1} † ^α	0	0	0	$\frac{i a_0 k}{4 \sqrt{2}}$	0	$-\frac{i a_0 k}{4 \sqrt{6}}$	$\frac{1}{4}\bar{l}\sqrt{\frac{5}{6}}a_0k$	$-\frac{i a_0 k}{4 \sqrt{3}}$	$-\frac{i a_0 k}{4 \sqrt{6}}$	0

Quadratic (free) action
$S_{F} == \iiint (\frac{1}{4} (2 a_0 \Gamma^{\alpha}_{\alpha}{}^{\beta} \Gamma^{\chi}_{\beta\chi} + 4 h^{\alpha\beta} \mathcal{T}_{\alpha\beta} + \Gamma^{\alpha\beta\chi} (-2 a_0 \Gamma_{\beta\chi\alpha} + 4 \Delta_{\alpha\beta}))$
$a_0 h_{\chi}^{\chi} \partial_{\beta} \Gamma_{\alpha}^{\alpha\beta} + a_0 h_{\chi}^{\chi} \partial_{\beta} \Gamma_{\alpha}^{\alpha\beta} - 2 a_0 h_{\alpha\chi} \partial_{\beta} \Gamma^{\alpha\beta\chi} + 22 a_1 \partial^{\alpha} \Gamma_{\delta}^{\chi\delta} \partial_{\beta} \Gamma_{\chi\alpha}^{\chi\delta}$
$2 a_1 \partial^{\alpha} \Gamma_{\chi\alpha}^{\ \beta} \partial_{\beta} \Gamma^{\chi\delta}_{\ \delta} - 76 a_1 \partial^{\alpha} \Gamma^{\chi\delta}_{\ \chi} \partial_{\beta} \Gamma_{\delta\alpha}^{\ \beta} + 2 a_0 h_{\beta\chi} \partial^{\chi} \Gamma^{\alpha}_{\ \alpha}^{\ \beta} -$
$2 a_1 \partial_{\beta} \Gamma_{\chi \delta}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} - 2 a_1 \partial_{\beta} \Gamma_{\delta \chi}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} + 2 a_1 \partial_{\chi} \Gamma_{\beta \delta}^{\delta} \partial^{\chi} \Gamma_{\alpha}^{\alpha \beta} -$
$2a_1\partial_\chi \Gamma^\delta_{\beta\delta}\partial^\chi \Gamma^\alpha_{\alpha}{}^\beta - 2a_1\partial_\chi \Gamma^\delta_{\delta\beta}\partial^\chi \Gamma^\alpha_{\alpha}{}^\beta - 22a_1\partial_\beta \Gamma^{\delta}_{\delta}\partial^\chi \Gamma^{\alpha\beta}_{\alpha} +$
$38 a_1 \partial_{\beta} \Gamma^{\delta}_{\chi\delta} \partial^{\chi} \Gamma^{\alpha\beta}_{\alpha} + 22 a_1 \partial_{\chi} \Gamma^{\delta}_{\beta\delta} \partial^{\chi} \Gamma^{\alpha\beta}_{\alpha} - 2 a_1 \partial_{\chi} \Gamma^{\delta}_{\beta\delta} \partial^{\chi} \Gamma^{\alpha\beta}_{\alpha} +$
$4a_1\partial_\alpha \Gamma_{\chi}^{\delta}\partial^\chi \Gamma^{\alpha\beta}_{\beta} - 4a_1\partial_\chi \Gamma_{\alpha}^{\delta}\partial^\chi \Gamma^{\alpha\beta}_{\beta} - 2a_1\partial_\chi \Gamma^{\alpha\beta\chi}\partial_\delta \Gamma_{\alpha\beta}^{\delta} -$
$2 a_1 \partial_{\beta} \Gamma^{\alpha\beta\chi} \partial_{\delta} \Gamma_{\alpha\chi}^{ \ \delta} - 2 a_1 \partial_{\beta} \Gamma^{\alpha\beta\chi} \partial_{\delta} \Gamma_{\alpha}^{ \ \delta} + 38 a_1 \partial_{\chi} \Gamma^{\alpha\beta\chi} \partial_{\delta} \Gamma_{\beta\alpha}^{ \ \delta} +$
$4 a_1 \partial^{\chi} \Gamma^{\alpha}_{\alpha}{}^{\beta} \partial_{\delta} \Gamma^{\delta}_{\beta \chi} + 2 a_1 \partial^{\chi} \Gamma^{\alpha}_{\alpha}{}^{\beta} \partial_{\delta} \Gamma^{\delta}_{\chi\beta} + 2 a_1 \partial^{\chi} \Gamma^{\alpha\beta}_{\alpha} \partial_{\delta} \Gamma^{\delta}_{\chi\beta} -$
$2 a_1 \partial_{\beta} \Gamma^{\alpha\beta\chi} \partial_{\delta} \Gamma_{\chi \alpha}^{\delta} + 2 a_1 \partial^{\chi} \Gamma_{\beta\alpha}^{\beta} \partial_{\delta} \Gamma_{\chi}^{\delta\alpha} + 4 a_1 \partial^{\chi} \Gamma_{\alpha}^{\alpha\beta} \partial_{\delta} \Gamma_{\chi \beta}^{\delta} -$
$2 a_1 \partial_{\beta} \Gamma^{\alpha}_{\alpha}{}^{\beta} \partial_{\delta} \Gamma^{\chi}_{\chi}{}^{\delta} + 4 a_1 \partial_{\beta} \Gamma^{\alpha}_{\alpha}{}^{\beta} \partial_{\delta} \Gamma^{\chi\delta}_{\chi} - 2 a_1 \partial_{\beta} \Gamma^{\alpha\beta}_{\alpha} \partial_{\delta} \Gamma^{\chi\delta}_{\chi} +$
$2 a_1 \partial_{\alpha} \Gamma_{\beta \chi \delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\beta \delta \chi} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\chi \beta \delta} \partial^{\delta} \Gamma^{\alpha \beta \chi} +$
$2 a_1 \partial_{\alpha} \Gamma_{\chi \delta \beta} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\delta \beta \chi} \partial^{\delta} \Gamma^{\alpha \beta \chi} + 4 a_1 \partial_{\alpha} \Gamma_{\delta \chi \beta} \partial^{\delta} \Gamma^{\alpha \beta \chi} -$
$2a_1\partial_\beta \Gamma_{\alpha\chi\delta}\partial^\delta \Gamma^{\alpha\beta\chi} - 2a_1\partial_\beta \Gamma_{\alpha\delta\chi}\partial^\delta \Gamma^{\alpha\beta\chi} - 2a_1\partial_\beta \Gamma_{\chi\delta\alpha}\partial^\delta \Gamma^{\alpha\beta\chi} -$
$2 a_1 \partial_{\chi} \Gamma_{\alpha\beta\delta} \partial^{\delta} \Gamma^{\alpha\beta\chi} - 2 a_1 \partial_{\chi} \Gamma_{\beta\alpha\delta} \partial^{\delta} \Gamma^{\alpha\beta\chi} + 4 a_1 \partial_{\chi} \Gamma_{\beta\delta\alpha} \partial^{\delta} \Gamma^{\alpha\beta\chi} -$
$4 a_1 \partial_{\delta} \Gamma_{\alpha\beta\chi} \partial^{\delta} \Gamma^{\alpha\beta\chi} - 4 a_1 \partial_{\delta} \Gamma_{\alpha\chi\beta} \partial^{\delta} \Gamma^{\alpha\beta\chi} - 2 a_1 \partial_{\delta} \Gamma_{\beta\alpha\chi} \partial^{\delta} \Gamma^{\alpha\beta\chi} -$
$2 a_1 \partial_{\delta} \Gamma_{\beta \chi \alpha} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 2 a_1 \partial_{\delta} \Gamma_{\chi \beta \alpha} \partial^{\delta} \Gamma^{\alpha \beta \chi} - 22 a_1 \partial_{\beta} \Gamma_{\delta \alpha}^{ \beta} \partial^{\delta} \Gamma^{\alpha \chi}_{ \chi} -$
$2 a_1 \partial^{\alpha} \Gamma_{\delta \alpha}^{\ \beta} \partial^{\delta} \Gamma_{\beta \ \chi}^{\ \chi} + 2 a_1 \partial_{\beta} \Gamma_{\delta \alpha}^{\ \beta} \partial^{\delta} \Gamma_{\chi}^{\chi \alpha}))[t, x, y, z] dz dy dx dt$

$\Gamma_{0^{-}}^{\#1} +$	$h_{0+}^{#2} \dagger$	$h_{0+}^{#1}$ †	Γ ₀ ^{#4} †	Γ ₀ ^{#3} †	Γ ₀ ^{#2} †	Γ ₀ ^{#1} †	
0	0	$\frac{ia_0 k}{2 \sqrt{2}}$	$-\frac{10 a_1 k^2}{\sqrt{3}}$	$10 \sqrt{\frac{2}{3}} a_1 k^2$	0	$\frac{1}{2}\left(-a_0+25a_1k^2\right)$	Γ ₀ ^{#1}
0	0	0	$-\frac{a_0}{2\sqrt{2}}$	$\frac{2}{0}$	0	0	Γ ₀ ^{#2}
0	$\frac{i a_0 k}{4}$	$-\frac{ia_0k}{4\sqrt{3}}$	$-\frac{3a_0+46a_1 k^2}{6 \sqrt{2}}$	23 <i>a</i> 1 k ² 3	$\frac{a_0}{2}$	$10\sqrt{\frac{2}{3}}a_1k^2$	Γ#3 0+
0	$-\frac{ia_0k}{4\sqrt{2}}$		$\frac{1}{6}$ (:	- 3,			Γ#4 0+
0	0	0	$-\frac{ia_0k}{4\sqrt{6}}$	$\frac{i a_0 k}{4 \sqrt{3}}$	0	$-\frac{ia_0k}{2\sqrt{2}}$	$h_{0+}^{#1}$
0	0	0	$\frac{i a_0 k}{4 \sqrt{2}}$	$-\frac{1}{4}\bar{l}a_0k$	0	0	$h_{0+}^{#2}$
$\frac{1}{2}\left(-a_0+a_1k^2\right)$	0	0	0	0	0	0	Γ#1 0-

		4 √6							
	-	2	6		2	S	S		
	Total constraints:	$2 \Delta_{1}^{\#6\alpha} + \Delta_{1}^{\#4\alpha} + 2 \Delta_{1}^{\#5\alpha} + \Delta_{1}^{\#3\alpha} == 0$	$6 \mathcal{T}_{1}^{\#1\alpha} - ik (3 \Delta_{1}^{\#2\alpha} - \Delta_{1}^{\#5\alpha} + \Delta_{1}^{\#3\alpha}) == 0 3$	$\Delta_{0+}^{*3} + 2\Delta_{0+}^{*4} + 3\Delta_{0+}^{*2} == 0$	$2\mathcal{T}_{0+}^{*2} - ik\Delta_{0+}^{*2} == 0$	SO(3) irreps	Source constraints/gauge generators		
-	Ø	3	3	1	1	Multiplicities			
			Δ.	#1					
		a. 0	_	#1 3 αβ	X				
Δ	#1 \3-	$+^{\alpha\beta\gamma}$	(- -	2 +7.a.r	μ2				

$\Delta_{0^{-}}^{#1}$ †	T ₀ ^{#2} †	${\cal T}_{0^+}^{*1}$ †	$\Delta_{0^{+}}^{#4}$ †	Δ ₀ ^{#3} †	$\Delta_{0+}^{#2}$ †	$\Delta_{0}^{#1}$ †	
0	$\frac{2i\sqrt{6}k}{16a_0+3a_0k^2}$	$\frac{2i\sqrt{2}}{a_0k}$	$\frac{8}{\sqrt{3} (16 a_0 + 3 a_0 k^2)}$	$-\frac{4\sqrt{\frac{2}{3}}}{16a_0+3a_0k^2}$	$\frac{4 \sqrt{6}}{16 a_0 + 3 a_0 k^2}$	0	$\Delta_{0}^{\#1}_{+}$
0	$-\frac{24 i k (3 a_0 + 197 a_1 k^2)}{{a_0}^2 (16 + 3 k^2)^2}$	$\frac{8i\sqrt{3}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$-\frac{8\sqrt{2}(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	$\frac{16(19a_0 + (3a_0 + 197a_1)k^2)}{a_0^2(16 + 3k^2)^2}$	$-\frac{48 (3 a_0 + 197 a_1 k^2)}{{a_0}^2 (16 + 3 k^2)^2}$	$\frac{4 \sqrt{6}}{16 a_0 + 3 a_0 k^2}$	$\Delta_0^{\#2}$
0	$\frac{8ik(19a_0 + (3a_0 + 197a_1)k^2)}{{a_0}^2(16 + 3k^2)^2}$	$-\frac{8i(a_0-65a_1k^2)}{\sqrt{3}a_0^2k(16+3k^2)}$	$-\frac{8\sqrt{2}(22a_0+(3a_0+394a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$-\frac{16 (35 a_0 + (6 a_0 + 197 a_1) k^2)}{3 a_0^2 (16 + 3 k^2)^2}$	$\frac{16(19a_0 + (3a_0 + 197a_1)k^2)}{a_0^2(16 + 3k^2)^2}$	$-\frac{4\sqrt{\frac{2}{3}}}{16a_0+3a_0k^2}$	$\Delta_0^{\#3}$
0	$-\frac{4i\sqrt{2}k(10a_0+(3a_0-394a_1)k^2)}{{a_0}^2(16+3k^2)^2}$	$-\frac{8i\sqrt{\frac{2}{3}}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$\frac{32(13a_0 + (3a_0 - 197a_1)k^2)}{3a_0^2(16 + 3k^2)^2}$	$-\frac{8\sqrt{2}(22a_0+(3a_0+394a_1)k^2)}{3a_0^2(16+3k^2)^2}$	$-\frac{8\sqrt{2}(10a_0+(3a_0-394a_1)k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{8}{\sqrt{3} (16 a_0 + 3 a_0 k^2)}$	$\Delta_0^{\#4}$
0	$\frac{4\sqrt{3}(a_0-65a_1k^2)}{a_0^2(16+3k^2)}$	$\frac{4(a_0-25a_1k^2)}{a_0^2k^2}$	$\frac{8i\sqrt{\frac{2}{3}}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$\frac{8i(a_0-65a_1k^2)}{\sqrt{3}a_0^2k(16+3k^2)}$	$-\frac{8i\sqrt{3}(a_0-65a_1k^2)}{a_0^2k(16+3k^2)}$	$-\frac{2i\sqrt{2}}{a_0k}$	${\mathcal T}_{0^+}^{\sharp 1}$
0	$-\frac{12k^2(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	$\frac{4\sqrt{3}(a_0-65a_1k^2)}{a_0^2(16+3k^2)}$	$\frac{4i\sqrt{2}k(10a_0+(3a_0-394a_1)k^2)}{{a_0}^2(16+3k^2)^2}$	$-\frac{8ik(19a_0+(3a_0+197a_1)k^2)}{{a_0}^2(16+3k^2)^2}$	$\frac{24ik(3a_0+197a_1k^2)}{a_0^2(16+3k^2)^2}$	$-\frac{2i\sqrt{6}k}{16a_0+3a_0k^2}$	${\mathcal T}_{0^+}^{\#2}$
$-\frac{2}{a_{0}-a_{1}k^{2}}$	0	0	0	0	0	0	$\Delta_{0^{\text{-}}}^{\#1}$

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$\Delta_{2}^{\#1}_{\alpha\beta}$	$\Delta^{\#2}_{2^+ lphaeta}$	$\Delta^{\#3}_{2}^{+}{}_{lphaeta}$	${\mathcal T}^{\sharp 1}_{2^+lphaeta}$	$\Delta_2^{\#1}_{\alpha\beta\chi}$	$\Delta_{2}^{\#2}{}_{\alpha\beta\chi}$
$\Delta_{2}^{\#3} + \alpha \beta = \frac{4}{\sqrt{3} a_{0}} - \frac{2 \sqrt{2} (a_{0} + 52 a_{1} k^{2})}{3 a_{0}^{2}} = \frac{8 (a_{0} - 26 a_{1} k^{2})}{3 a_{0}^{2}} - \frac{4 i \sqrt{\frac{2}{3}} (a_{0} + 31 a_{1} k^{2})}{a_{0}^{2} k} = 0 = 0$ $\mathcal{T}_{2}^{\#1} + \alpha \beta = \frac{4 i \sqrt{2}}{a_{0} k} = \frac{4 i (a_{0} + 31 a_{1} k^{2})}{\sqrt{3} a_{0}^{2} k} = \frac{4 i \sqrt{\frac{2}{3}} (a_{0} + 31 a_{1} k^{2})}{a_{0}^{2} k} = -\frac{8 (a_{0} + 11 a_{1} k^{2})}{a_{0}^{2} k^{2}} = 0$ $\Delta_{2}^{\#1} + \alpha \beta \chi = 0 = 0$ $\Delta_{2}^{\#1} + \alpha \beta \chi = 0$ $0 = 0$ $0 = \frac{4}{a_{0} - a_{1} k^{2}} = 0$	$\Delta_2^{\#1} \dagger^{\alpha\beta}$	0		$\frac{4}{\sqrt{3} a_0}$		0	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\Delta_{2}^{\#2} \dagger^{\alpha\beta}$	$\frac{2\sqrt{\frac{2}{3}}}{a_0}$	$-\frac{8(a_0+13a_1k^2)}{3a_0^2}$			0	0
$\Delta_{2}^{+1} + \alpha \beta \chi = 0$ $\Delta_{2}^{+1} + \alpha \beta \chi = 0$ 0 0 0 0 0 0 0 0 0	$\Delta_{2}^{\#3} \dagger^{\alpha\beta}$	$\frac{4}{\sqrt{3} a_0}$				0	0
#2 αβγ	$\mathcal{T}_{2}^{\sharp 1}\dagger^{lphaeta}$	$-\frac{4i\sqrt{2}}{a_0k}$			$-\frac{8(a_0+11a_1k^2)}{a_0^2k^2}$	0	0
$\Delta_{2}^{\#2} + \alpha \beta \chi = 0$ 0 0 0 $\frac{4}{a_0 - 5 a_1 k^2}$	$\Delta_2^{\#1} \dagger^{\alpha\beta\chi}$	0	0	0	0	$\frac{4}{a_0 - a_1 k^2}$	0
	$\Delta_2^{\#2} \dagger^{\alpha\beta\chi}$	0	0	0	0	0	$\frac{4}{a_0-5a_1k^2}$

$\Gamma_{2}^{\#2} + \alpha \beta \chi$	$\Gamma_{2}^{#1} \uparrow^{\alpha\beta\chi}$	$h_{2+}^{#1} \dagger^{\alpha\beta}$	$\Gamma_{2+}^{#3} + \alpha\beta$	$\Gamma_{2+}^{#2} + \alpha \beta$	$\Gamma_{2+}^{*1} + \alpha \beta$	
0	0	$-\frac{ia_0k}{4\sqrt{2}}$	$\frac{5 a_1 k^2}{\sqrt{3}}$	$-5\sqrt{\frac{2}{3}}a_1k^2$	$\frac{1}{2^{+}} \uparrow^{\alpha \beta} \left[\frac{1}{4} \left(a_0 + 11 a_1 k^2 \right) \right]$	$\Gamma_{2}^{\#1}{}_{lphaeta}$
0	0	$-\frac{ia_0k}{4\sqrt{3}}$	$-\frac{a_1 k^2}{6 \sqrt{2}}$	$\frac{1}{6} \left(-3 a_0 + a_1 k^2 \right)$	$-5\sqrt{\frac{2}{3}}a_1k^2$	$\Gamma_{2}^{#2} + \alpha \beta$
0	0	$\frac{i a_0 k}{4 \sqrt{6}}$	$\frac{1}{12} (3 a_0 + a_1 k^2)$	$-\frac{a_1 k^2}{6 \sqrt{2}}$	$\frac{5a_1k^2}{\sqrt{3}}$	$\Gamma_{2}^{#3} + \alpha \beta$
0	0	0	$-\frac{i a_0 k}{4 \sqrt{6}}$	$\frac{i a_0 k}{4 \sqrt{3}}$	$\frac{i a_0 k}{4 \sqrt{2}}$	$h_{2}^{\#1} \alpha \beta$
0	$\frac{1}{4} (a_0 - a_1 k^2)$	0	0	0	0	$\Gamma_{2^{-}}^{\#1}{}_{lphaeta\chi}$
$\frac{1}{4}(a_0-5a_1k^2)$	0	0	0	0	0	$\Gamma_{2^-}^{\#2} \alpha \beta \chi$

	$\Gamma_{3}^{\#1}{}_{\alpha\beta\chi}$
$\Gamma_3^{#1} + \alpha \beta \chi$	$\frac{1}{2}$ (- a_0 - 7 $a_1 k^2$)

Massive and massless spectra

** MassiveAnalysisOfSector...Null

Unitarity conditions

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$\Gamma_{3}^{\#1} \dagger^{\alpha\beta\chi}$	$\frac{1}{2} \left(-a_0 - 7 a_1 k^2 \right)$