## Particle spectrograph

## Wave operator and propagator

${\mathcal T}_{1^{\bar{-}}\alpha}^{\#1}$	0	0	0	0	0	0	0	0	0	0
$\Delta_{1}^{\#6}{}_{\alpha}$	0	0	0	0	0	$-\frac{1}{6a_0}$	$-\frac{\sqrt{5}}{6a_0}$	$-\frac{7}{3\sqrt{2}a_0}$	$\frac{5}{3a_0}$	0
$\Delta_{1}^{\#5}{}_{\alpha}$	0	0	0	0	0	$-\frac{1}{6\sqrt{2}}a_0$	$-\frac{\sqrt{\frac{5}{2}}}{6a_0}$	$\frac{17}{6a_0}$	$-\frac{7}{3\sqrt{2}a_0}$	0
$\Delta_{1^{\bar{-}}}^{\#4}\alpha$	0	0	0	0	0	$\frac{5\sqrt{5}}{12a_0}$	$\frac{1}{12a_0}$	$-\frac{\sqrt{\frac{5}{2}}}{6a_0}$	$-\frac{\sqrt{5}}{6a_0}$	0
$\Delta_{1}^{\#3}{}_{\alpha}$	0	0	0	0	0	$-\frac{19}{12 a_0}$	$\frac{5\sqrt{5}}{12a_0}$	$-\frac{1}{6\sqrt{2}a_0}$	$-\frac{1}{6a_0}$	0
$\Delta_{1}^{\#2}{}_{\alpha}$	0	0	0	$\frac{2\sqrt{2}}{a_0}$	$\frac{2}{a_0}$	0	0	0	0	0
$\Delta_{1}^{\#1}{}_{\alpha}$	0	0	0	0	$\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0
$\Delta_{1}^{\#3}{}_{+}\alpha\beta$	0	0	4 a <sub>0</sub>	0	0	0	0	0	0	0
$\Delta_{1}^{\#2}{}_{\alpha\beta}$	$-\frac{2\sqrt{2}}{a_0}$	$\frac{2}{a_0}$	0	0	0	0	0	0	0	0
$\Delta_{1}^{\#1}{}_{\alpha\beta}$	0	$\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0	0	0	0
	$\Delta_{1}^{\#1} + \alpha \beta$	$\Delta_{1}^{#2} + \alpha^{\beta}$	$\Delta_{1}^{#3} + \alpha \beta$	$\Delta_{1}^{\#1} +^{\alpha}$	$\Delta_{1}^{\#2} +^{\alpha}$	$\Delta_{1}^{\#3} +^{\alpha}$	$\Delta_{1}^{#4} +^{\alpha}$	$\Delta_1^{\#5}  \dagger^{lpha}$	$\Delta_{1}^{\#6}  \dagger^{\alpha}$	$\mathcal{T}_{1}^{\#1} \dagger^{lpha}$

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$h_{1^{-}}^{\#1}\alpha$	0	0	0	0	0	0	0	0	0	0
$\Gamma_{1}^{\#6}{}_{lpha}$	0	0	0	0	0	$\frac{9}{0p}$	$-\frac{\sqrt{5} a_0}{6}$	$\frac{a_0}{6\sqrt{2}}$	$\frac{5a_0}{12}$	0
$\Gamma_{1}^{\#5}$	0	0	0	0	0	$-\frac{a_0}{6\sqrt{2}}$	$-\frac{1}{6}\sqrt{\frac{5}{2}}a_0$	8 <del>0</del>	$\frac{a_0}{6\sqrt{2}}$	0
$\Gamma_{1^{-}\alpha}^{\#4}$	0	0	0	0	0	$\frac{\sqrt{5} a_0}{6}$	$\frac{a_0}{3}$	$-\frac{1}{6}\sqrt{\frac{5}{2}}a_0$	$-\frac{\sqrt{5} a_0}{6}$	0
$\Gamma_{1^{^{-}}\alpha}^{\#3}$	0	0	0	0	0	- <u>a0</u>	$\frac{\sqrt{5} a_0}{6}$	$-\frac{a_0}{6\sqrt{2}}$	- <u>a0</u>	0
$\Gamma_{1^{-}}^{\#2}{}_{\alpha}$	0	0	0	$\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0
$\Gamma_{1^{-}}^{\#1}{}_{\alpha}$	0	0	0	$-\frac{a_0}{4}$	$\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0
$\Gamma_{1}^{\#3}{}_{+}\alpha\beta$	0	0	<u>a</u> 0 4	0	0	0	0	0	0	0
$\Gamma_{1}^{\#1}$ $\alpha_{\beta}^{\#2}$ $\Gamma_{1}^{\#2}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0	0	0	0
$\Gamma_1^{\#1}{}_+\alpha\beta$	$-\frac{a_0}{4}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0	0	0
	$\Gamma_1^{#1} + \alpha \beta$	$\Gamma_1^{\#2} + \alpha \beta$	$\Gamma_1^{\#3} + \alpha \beta$	$\Gamma_{1}^{\#1} +^{\alpha}$	$\Gamma_1^{\#2} +^{\alpha}$	$\Gamma_1^{\#3} + \alpha$	$\Gamma_1^{\#4} + \alpha$	$\Gamma_{1}^{\#5} +^{lpha}$	$\Gamma_{1}^{\#6}\dagger^{lpha}$	$h_1^{\#1} + \alpha$

$\frac{1}{8} (8 \ h^{\alpha\beta} \ \mathcal{T}_{\alpha\beta} - 4 \ \Gamma^{\alpha\beta\chi} (a_0 \ \Gamma_{\beta\chi\alpha} - 2 \ \Delta_{\alpha\beta\chi} + a_0 \ \partial_{\beta}h_{\alpha\chi}) + 2 \ a_0 \ \Gamma^{\alpha\beta}_{\alpha} \ \partial_{\beta}h_{\chi}^{x} - h_{\chi}^{x} \partial_{\beta}\Gamma^{\alpha\beta}_{\alpha} + 4 \ a_0 \ h^{\alpha}_{\chi} \partial_{\beta}\Gamma^{\alpha\beta\chi} + 4 \ a_0 \ h^{\alpha}_{\chi} \partial_{\beta}h_{\chi}^{x} - h_{\chi}^{x} \partial_{\beta}h_{\chi}^{x} + h_{\chi}^{x} \partial_{\gamma}h_{\alpha\beta}^{x} - h_{\chi}^{x} \partial_{\gamma}h_{\alpha\beta}^{x} + h_{\chi}^{x} \partial_{\gamma}h_{\alpha\beta}^{x} - h_{\chi}^{x} \partial_{\gamma}h_{\alpha\beta}^{x} + $	Quadratic (free) action
$\iiint \left\{ \left( \frac{1}{8} \left( 8 \ h^{\alpha\beta} \ \mathcal{T}_{\alpha\beta} - 4 \ \Gamma^{\alpha\beta\chi} \left( a_0 \ \Gamma_{\beta\chi\alpha} - 2 \ \Delta_{\alpha\beta\chi} + a_0 \ \partial_{\beta}h_{\alpha\chi} \right) + 2 \ a_0 \ \Gamma^{\alpha\beta} \ \partial_{\beta}h^{\chi} - 2 \ a_0 \ h^{\chi} \ \partial_{\beta}\Gamma^{\alpha}{}^{\alpha} + 4 \ a_0 \ h^{\chi} \ \partial_{\beta}\Gamma^{\alpha\beta}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\beta}\rho^{\alpha}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\beta}\rho^{\alpha}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\beta}\rho^{\alpha}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}h^{\beta}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}h^{\beta}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}\rho^{\beta}h^{\alpha}{}^{\alpha} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}\partial_{\lambda}h^{\alpha\beta} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}\partial_{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial_{\lambda}h^{\beta}{}^{\beta} - 2 \ a_0 \ \partial_{\beta}h^{\alpha\chi} \ \partial^{\beta}h^{\alpha\chi} + 4 \ a_0 \ h^{\alpha\beta} \ \partial_{\lambda}\rho^{\alpha}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial_{\lambda}h^{\beta}{}^{\beta} + 4 \ a_0 \ h^{\alpha\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\alpha\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\alpha\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\alpha\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\beta} \ \partial^{\lambda}h^{\alpha\beta} - 2 \ a_0 \ h^{\alpha} \ \partial_{\lambda}\partial^{\lambda}h^{\beta} + 4 \ a_0 \ h^{\beta} \ \partial^{\lambda}h^{\beta} + 4 $	S <sub>F</sub> ==
$ 2 a_0 h_{\chi}^{X} \partial_{\beta} \Gamma^{\alpha}{}_{\alpha}^{\beta} + 2 a_0 h_{\chi}^{X} \partial_{\beta} \Gamma^{\alpha\beta}{}_{\alpha} - 4 a_0 h_{\alpha\chi}^{\alpha} \partial_{\beta} \Gamma^{\alpha\beta\chi} + 4 a_0 h^{\alpha\beta} \partial_{\beta} \partial_{\alpha} h_{\chi}^{X} - a_0 \partial_{\beta} h_{\chi}^{X} + a_0 \partial^{\beta} h_{\alpha}^{\alpha} \partial_{\chi} h_{\beta}^{X} + a_0 \partial^{\beta} h_{\alpha}^{\alpha} \partial_{\chi} h_{\beta}^{X} + 2 \partial_{\lambda} h_{\chi}^{X} + 2 \partial_{\chi} h_{\chi}^{X} $	$\iiint (\frac{1}{8} (8 \ h^{\alpha\beta} \ \mathcal{T}_{\alpha\beta} - 4 \ \Gamma^{\alpha\beta\chi} (a_0 \ \Gamma_{\beta\chi\alpha} - 2 \ \Delta_{\alpha\beta\chi} + a_0 \ \partial_{\beta}h_{\alpha\chi}) + 2 \ a_0 \ \Gamma^{\alpha\beta}_{\ \alpha} \ \partial_{\beta}h_{\chi}^{\ \chi} -$
$a_{0} \partial_{\beta} h^{X}_{\chi} \partial^{\beta} h^{\alpha}_{\alpha} - 4 a_{0} \partial_{\alpha} h^{\alpha\beta} \partial_{\chi} h^{X}_{\beta} + 4 a_{0} \partial^{\beta} h^{\alpha}_{\alpha} \partial_{\chi} h^{X}_{\beta} +$ $2 a_{0} \Gamma^{\alpha}_{\alpha} \beta (2 \Gamma^{X}_{\beta\chi} - \partial_{\beta} h^{X}_{\chi} + 2 \partial_{\chi} h^{\beta}_{\beta}) - 8 a_{0} h^{\alpha\beta} \partial_{\chi} \partial_{\beta} h^{\chi}_{\alpha} +$ $2 a_{0} h^{\alpha}_{\alpha} \partial_{\chi} \partial_{\beta} h^{\beta\chi} + 4 a_{0} h^{\alpha\beta} \partial_{\chi} \partial_{\chi} h^{\alpha\beta} - 2 a_{0} h^{\alpha}_{\alpha} \partial_{\chi} \partial_{\lambda} h^{\beta}_{\beta} - 2 a_{0} \partial_{\beta} h_{\alpha\chi} \partial_{\chi} h^{\alpha\beta} +$ $3 a_{0} \partial_{\chi} h_{\alpha\beta} \partial^{\chi} h^{\alpha\beta} + 4 a_{0} h_{\beta\chi} \partial^{\chi} \Gamma^{\alpha}_{\alpha} \beta))[t, \chi, y, z] d z d y d x d t$ $3 a_{0} \partial_{\chi} h_{\alpha\beta} \partial^{\chi} h^{\alpha\beta} + 4 a_{0} h_{\beta\chi} \partial^{\chi} \Gamma^{\alpha}_{\alpha} \beta))[t, \chi, y, z] d z d y d x d t$ $\Delta^{\#1}_{0^{+}} \Delta^{\#2}_{0^{+}} \Delta^{\#3}_{0^{+}} \Delta^{\#4}_{0^{+}} T^{\#1}_{0^{+}} T^{\#1}_{0^{+}} T^{\#2}_{0^{+}} \Delta^{\#1}_{0^{-}}$	$2a_0h_X^{}\partial_{eta}\Gamma^{lphaeta}_{$
$2 a_{0} \Gamma^{\alpha}_{\alpha}{}^{\beta} (2 \Gamma^{\chi}_{\beta\chi} - \partial_{\beta}h^{\chi}_{\chi} + 2 \partial_{\chi}h^{\chi}_{\beta}) - 8 a_{0} h^{\alpha\beta} \partial_{\chi}\partial_{\beta}h^{\chi}_{\alpha} +$ $2 a_{0} h^{\alpha}_{\alpha} \partial_{\chi}\partial_{\beta}h^{\beta\chi} + 4 a_{0} h^{\alpha\beta} \partial_{\chi}\partial^{\chi}h_{\alpha\beta} - 2 a_{0} h^{\alpha}_{\alpha} \partial_{\chi}\partial^{\chi}h^{\beta}_{\beta} - 2 a_{0} \partial_{\beta}h_{\alpha\chi} \partial^{\chi}h^{\alpha\beta} +$ $3 a_{0} \partial_{\chi}h_{\alpha\beta} \partial^{\chi}h^{\alpha\beta} + 4 a_{0} h_{\beta\chi} \partial^{\chi}\Gamma^{\alpha}_{\alpha}{}^{\beta}))[t, x, y, z] dz dy dx dt$ $\Delta^{\#1}_{0^{+}} \Delta^{\#2}_{0^{+}} \Delta^{\#3}_{0^{+}} \Delta^{\#4}_{0^{+}} T^{\#1}_{0^{+}} T^{\#2}_{0^{+}} \Delta^{\#1}_{0^{-}}$ $\Delta^{\#1}_{0^{+}} \Delta^{\#2}_{0^{+}} \Delta^{\#3}_{0^{+}} \Delta^{\#4}_{0^{+}} T^{\#1}_{0^{+}} T^{\#2}_{0^{+}} \Delta^{\#1}_{0^{-}}$	$a_0\partial_{eta}h^{\chi}_{\ \ \chi}\partial^{eta}h^{lpha}_{\ \ lpha}-4a_0\partial_{lpha}h^{lpha}_{\ \ eta}+4a_0\partial^{eta}h^{lpha}_{\ \ lpha}\partial_{\chi}h^{\ \chi}_{\ \ eta}+$
$2 a_0 h^{\alpha}_{\alpha} \partial_{x} \partial_{\beta} h^{\beta X} + 4 a_0 h^{\alpha \beta} \partial_{x} \partial^{X} h_{\alpha \beta} - 2 a_0 h^{\alpha}_{\alpha} \partial_{x} \partial^{X} h^{\beta}_{\beta} - 2 a_0 \partial_{\beta} h_{\alpha X} \partial^{X} h^{\alpha \beta} +$ $3 a_0 \partial_{x} h_{\alpha \beta} \partial^{X} h^{\alpha \beta} + 4 a_0 h_{\beta X} \partial^{X} \Gamma^{\alpha}_{\alpha} \beta) [t, x, y, z] dz dy dx dt$ $\Delta^{\#1}_{0^{+}} \Delta^{\#2}_{0^{+}} \Delta^{\#3}_{0^{+}} \Delta^{\#4}_{0^{+}} T^{\#1}_{0^{+}} T^{\#2}_{0^{+}} \Delta^{\#1}_{0^{-}}$	$2a_0 \Gamma^{\alpha}_{\alpha}{}^{\beta} (2\Gamma^{\chi}_{\beta\chi} - \partial_{\beta}h^{\chi}_{\chi} + 2\partial_{\chi}h^{\chi}_{\beta}) - 8a_0 h^{\alpha\beta} \partial_{\chi}\partial_{\beta}h^{\chi}_{\alpha} +$
$3 a_0 \partial_{\chi} h_{\alpha\beta} \partial^{\chi} h^{\alpha\beta} + 4 a_0 h_{\beta\chi} \partial^{\chi} \Gamma^{\alpha}_{\alpha} \beta) [t, \chi, y, z] dz dy d\chi dt$ $\Delta_{0^+}^{\#1} \Delta_{0^+}^{\#2} \Delta_{0^+}^{\#3} \Delta_{0^+}^{\#4} \mathcal{T}_{0^+}^{\#1} \mathcal{T}_{0^+}^{\#2} \Delta_{0^-}^{\#1}$	$2a_0 h^{\alpha}_{\alpha} \partial_{\chi} \partial_{\beta} h^{\beta\chi} + 4a_0 h^{\alpha\beta} \partial_{\chi} \partial^{\chi} h_{\alpha\beta} - 2a_0 h^{\alpha}_{\alpha} \partial_{\chi} \partial^{\chi} h^{\beta}_{\beta} - 2a_0 \partial_{\beta} h_{\alpha\chi} \partial^{\chi} h^{\alpha\beta} +$
$\Delta_{3^{-}}^{\#1}\alpha\beta\chi$	$3a_0\partial_\chi h_{\alpha\beta}\partial^\chi h^{\alpha\beta} + 4a_0h_{eta\chi}\partial^\chi \Gamma^{lpha}_{}))[t,\chi,y,z]dzdyd\chi dt$
	,

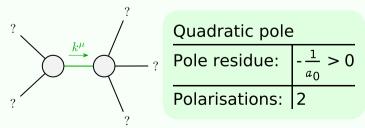
$\Lambda_{3}^{\#1}_{lpha eta}$	$-\frac{2}{a_0}$														$\frac{\Delta_0^{\#}}{\Delta_0^{\#}}$
	. † <sub>αβχ</sub>														$\frac{\mathcal{T}_{1}}{2}$
	Δ#1.							ı <sub>~</sub>							To
$\Delta_{0^{\text{-}}}^{\#1}$	0	0	0	0	0	0	$-\frac{2}{a_0}$	$\Delta_{2}^{\#2}$	0	0	0	0	0	$\frac{4}{a_0}$	$\alpha eta \chi$
$\mathcal{T}_{0}^{\#2}$	0	0	0	0	0	0	0	$\alpha eta_{\chi} \Delta$							$\Gamma_{2}^{\#2}$
${\mathcal T}_{0}^{\#1}$	0	0	0	0	$\frac{4}{a_0 k^2}$	0	0	$\Delta_{2^{\text{-}}}^{\#1}$	0	0	0	0	$\frac{4}{a_0}$	0	$\alpha eta \chi$
$\Delta_{0}^{\#4}$	0	$-\frac{1}{2\sqrt{2}a_0}$	$-\frac{1}{2\sqrt{2}a_0}$	$\frac{1}{2a_0}$	0	0	0	${\cal T}^{\#1}_{2^+lphaeta}$	0	0	0	$-\frac{8}{a_0 k^2}$	0	0	$h_{2}^{\#1} \alpha_{\beta} \Gamma_{2}^{\#1}$
$\Delta_{0}^{\#3}$	0	5 4 a 0	$-\frac{3}{4 a_0}$	$\frac{1}{2\sqrt{2} a_0}$	0	0	0	$^{\prime}_{\gamma}$ $\Delta_{2}^{\#3}$	0	0	$\frac{4}{a_0}$	0	0	0	$\Gamma_{2}^{\#3}$
$\Delta_0^{\#2}$	0	- 3 4 a 0	4 4 0	$\left  \frac{1}{2\sqrt{2} a_0} \right  -$	0	0	0	$\Delta_{2^{+}\alpha\beta}^{\#1} \; \Delta_{2^{+}\alpha\beta}^{\#2}$	$\frac{4}{a_0}$	$0 - \frac{2}{a_0}$	0 0	0 0	0 0	0 0	$\alpha \beta \Gamma_{2}^{\#2} \alpha \beta$
$\Delta_0^{\#1}$	$-\frac{2}{a_0}$	0	0	0	0	0	0	$\Delta_2^*$	$+\alpha\beta$	$+^{\alpha\beta}$	$+^{\alpha\beta}$				$\Gamma_{2}^{\#1}$
	$\Delta_{0}^{\#1} \uparrow$	$\Delta_{0}^{#2}$ †	$\Delta_{0}^{#3}$ †	$\Delta_{0}^{\#4}$ †	$\mathcal{T}_{0}^{\#1}$ †	$\mathcal{T}_{0}^{\#2}$ †	$\Delta_{0^-}^{\#1}  \dagger$		$\Delta_2^{\#1} \uparrow$	$\Delta_{2}^{#2} \dagger$	$\Delta_{2}^{#3}$ †	$\mathcal{T}_{2}^{\#1} +^{\alpha\beta}$	$\Delta_{2}^{#1} +^{\alpha \beta \chi}$	$\Delta_2^{#2} + ^{\alpha\beta\chi}$	

Source constraints/gauge generate	ors
SO(3) irreps	Multiplicities
$\mathcal{T}_{0}^{\#2} == 0$	1
$\Delta_{0^{+}}^{\#3} + 2 \Delta_{0^{+}}^{\#4} + 3 \Delta_{0^{+}}^{\#2} == 0$	1
$\mathcal{T}_{1}^{\#1\alpha} == 0$	3
$2 \Delta_{1}^{\#6\alpha} + \Delta_{1}^{\#4\alpha} + 2 \Delta_{1}^{\#5\alpha} + \Delta_{1}^{\#3\alpha} == 0$	3
Total constraints:	8

•	$\Gamma_{2}^{\#1}{}_{\alpha\beta}$	$\Gamma_2^{\#2}$	$\Gamma_{2}^{\#3}$	$h_2^{\#1}{}_+\alpha\beta$	$\Gamma_{2^{-}}^{\#1}_{\alpha\beta\chi}$	$\Gamma_{2^{-}}^{\#2} \alpha \beta \chi$
$\Gamma_{2}^{#1} + \alpha \beta$	<u>4</u>	0	0	0	0	0
$_{2}^{++}$ $+^{\alpha\beta}$	0	$-\frac{a_0}{2}$	0	0	0	0
$\Gamma_2^{#3} + \alpha \beta$	0	0	$\frac{a_0}{4}$	0	0	0
$h_2^{#1} + \alpha^{\beta}$	0	0	0	$-\frac{a_0 k^2}{8}$	0	0
$^{*1}_{2}$ $+^{\alpha\beta\chi}$	0	0	0	0	$\frac{a_0}{4}$	0
$^{++2}_{2^-} +^{\alpha\beta\chi}$	0	0	0	0	0	$\frac{a_0}{4}$
L#1	j r#2	£#3	P#4	h#1	h#2 r#1	1

$\Gamma_{0^{\text{-}}}^{\#1}$	0	0	0	0	0	0	$-\frac{a_0}{2}$
$h_0^{\#2}$	0	0	0	0	0	0	0
$h_0^{\#1}$	0	0	0	0	$\frac{a_0 k^2}{4}$	0	0
<b>L</b> #4 0+	0	$-\frac{a_0}{2\sqrt{2}}$	$-\frac{a_0}{2\sqrt{2}}$	<u>40</u>	0	0	0
Γ#3 0+	0	<u>40</u>	0	$-\frac{a_0}{2\sqrt{2}}$	0	0	0
$\Gamma_0^{\#2}$	0	0	$\frac{a_0}{2}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0
$\Gamma_0^{\#1}$	$-\frac{a_0}{2}$	0	0	0	0	0	0
	$\Gamma_{0}^{\#1}$ $\dagger$	Γ#2 †	Γ#3 †	Γ#4 0+	$h_{0}^{#1}$ †	$h_0^{\#2} \uparrow$	$\Gamma_{0}^{\#1}$ $\dagger$

## Massive and massless spectra



(No massive particles)

Unitarity conditions