

# Particle spectrograph

## Wave operator and propagator

SO(3) irreps	Fundamental fields	Multiplicities
$\omega_{0+}^{#2} == 0$	$\partial_\beta \partial_\alpha \omega^{\alpha\beta} == 0$	1
$\omega_{1-}^{#2\alpha} == 0$	$\partial_\chi \partial_\beta \partial_\rho \partial^\alpha \omega^\beta \chi == \partial_\chi \partial^\chi \partial_\beta \omega^{\alpha\beta}$	3
Total expected gauge generators:		4

$\omega_{1+}^{#1} \dagger^{\alpha\beta}$	$\omega_{1-}^{#1} \dagger^\alpha$	$\omega_{1-}^{#2} \dagger^\alpha$
$-\frac{4}{k^2 \kappa}$	0	0
0	$-\frac{4}{k^2 \kappa}$	0
0	0	0

$\omega_{0+}^{#1} \dagger$	$\omega_{0+}^{#2} \dagger$
$-\frac{4}{k^2 \kappa}$	0
0	0

$\theta_{0+}^{#1} \dagger$	$\theta_{0+}^{#2} \dagger$
$-\frac{k^2 \kappa}{4}$	0
0	0

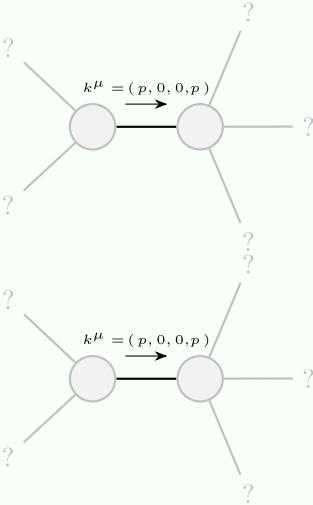
$\omega_{2+}^{#1} \dagger^{\alpha\beta}$
$-\frac{4}{k^2 \kappa}$

$\theta_{2+}^{#1} \dagger^{\alpha\beta}$
$-\frac{k^2 \kappa}{4}$

$\theta_{1+}^{#1} \dagger^{\alpha\beta}$	$\theta_{1-}^{#1} \dagger^\alpha$	$\theta_{1-}^{#2} \dagger^\alpha$
$-\frac{k^2 \kappa}{4}$	0	0
0	$-\frac{k^2 \kappa}{4}$	0
0	0	0

$$S == \iiint (\theta^{\alpha\beta} \omega_{\alpha\beta} + \frac{1}{4} \kappa (\partial_\nu \theta_{\mu\rho} - \partial_\rho \theta_{\mu\nu}) \partial^\rho \theta^{\mu\nu}) [t, x, y, z] dz dy dx dt$$

## Massive and massless spectra



Quadratic pole

Pole residue:	$-\frac{1}{\kappa} > 0$
Polarisations:	6

Quadratic pole (No massive particles)

Pole residue:	$\frac{1}{\kappa} > 0$
Polarisations:	2

## Unitarity conditions

(Unitarity is demonstrably impossible)