

Particle spectrograph

Wave operator and propagator

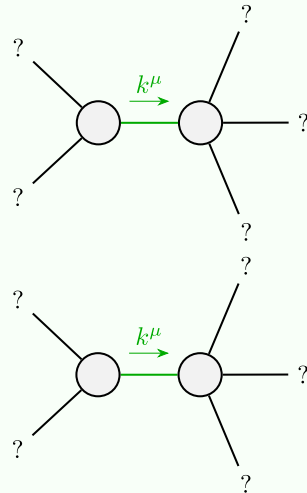
Quadratic (free) action

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

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

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

Massive and massless spectra



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

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

(No massive particles)

Unitarity conditions

(Unitarity is demonstrably impossible)