Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$$\mathcal{S}_F == \int\int\int\int (\mathcal{B}^{\alpha}\ \mathcal{J}_{\alpha} + 2\,\alpha\,(-\partial_{\alpha}\mathcal{B}_{\beta} + \partial_{\beta}\mathcal{B}_{\alpha})\,\partial^{\beta}\mathcal{B}^{\alpha})[t, x, y, z]\,dz\,dy\,dx\,dt$$

Source constraints/gauge generators

SO(3) irreps	Multiplicities
$\mathcal{J}^{\#1}_{0^+} == 0$	1
Total constraints:	1

$$\mathcal{J}^{\#1}_{1^-}{}_{\alpha}$$

$$\mathcal{J}^{\#1}_{1^-}\dagger^{\alpha}\ \boxed{\frac{1}{2\,\alpha\,k^2}}$$

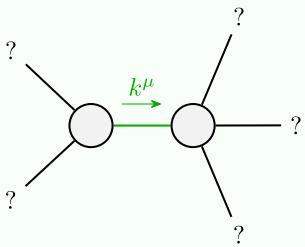
$$\mathcal{B}^{\#1}_{1^-}\dagger^{\alpha}\ \boxed{2\,\alpha\,k^2}\ \mathcal{B}^{\#1}_{1^-}{}_{\alpha}$$

$$\mathcal{J}^{\#1}_{0^+}$$

$$\mathcal{J}^{\#1}_{0^+}\dagger\ \boxed{0}$$

$$\mathcal{B}^{\#1}_{0^+}\dagger\ \boxed{0}\ \mathcal{B}^{\#1}_{0^+}$$

Massive and massless spectra



Quadratic pole

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

(No massive particles)

Unitarity conditions

$\alpha < 0$