

Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$S_F ==$

$$\iiint (h^{\alpha\beta} \mathcal{T}_{\alpha\beta} + \alpha \partial_\beta h^\chi_\chi \partial^\beta h^\alpha_\alpha + \alpha (-2 \partial_\beta h_{\alpha\chi} + \partial_\chi h_{\alpha\beta}) \partial^\chi h^{\alpha\beta}) [t, x, y, z] dz dy dx dt$$

Source constraints/gauge generators

SO(3) irreps	Multiplicities
$\mathcal{T}_1^{\#1\alpha} == 0$	3
Total constraints:	3

$$\begin{array}{cc} \mathcal{T}_{0+}^{\#1+} & \mathcal{T}_{0+}^{\#2+} \\ \begin{array}{|c|c|} \hline \frac{1}{\sqrt{3}\alpha k^2} & 0 \\ \hline \frac{4}{3\alpha k^2} & \frac{1}{\sqrt{3}\alpha k^2} \\ \hline \end{array} & \begin{array}{|c|c|} \hline 0 & \frac{1}{\sqrt{3}\alpha k^2} \\ \hline \frac{1}{\sqrt{3}\alpha k^2} & \frac{4}{3\alpha k^2} \\ \hline \end{array} \end{array}$$

$$h_{1-}^{\#1\alpha} \quad \begin{array}{|c|} \hline 0 \\ \hline \end{array}$$

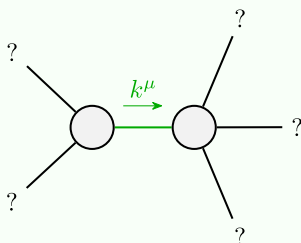
$$\begin{array}{cc} h_{0+}^{\#1+} & h_{0+}^{\#2+} \\ \begin{array}{|c|c|} \hline 4\alpha k^2 & \sqrt{3}\alpha k^2 \\ \hline \sqrt{3}\alpha k^2 & 0 \\ \hline \end{array} & \end{array}$$

$$\mathcal{T}_{2+}^{\#1+} \quad \begin{array}{|c|} \hline \frac{1}{\alpha k^2} \\ \hline \end{array}$$

$$h_{2+}^{\#1+} \quad \begin{array}{|c|} \hline \alpha k^2 \\ \hline \end{array}$$

$$\mathcal{T}_{1-}^{\#1\alpha} \quad \begin{array}{|c|} \hline 0 \\ \hline \end{array}$$

Massive and massless spectra



Quadratic pole

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

Polarisations: 3

(No massive particles)

Unitarity conditions

$$\alpha > 0$$