Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$\mathcal{S} ==$

$$\iiiint\Big(\beta\,(h_{\alpha\beta}\;h^{\alpha\beta} - h^{\alpha}{}_{\alpha}\;h^{\beta}{}_{\beta}) + h^{\alpha\beta}\;\mathcal{T}_{\alpha\beta} + \tfrac{1}{2}\,\alpha\,(\partial_{\beta}h^{\chi}{}_{\chi}\,\partial^{\beta}h^{\alpha}{}_{\alpha} + 2\,\partial_{\alpha}h^{\alpha\beta}\,\partial_{\chi}h_{\beta}{}^{\chi} - 2\,\partial^{\beta}h^{\alpha}{}_{\alpha}\,\partial_{\chi}h_{\beta}{}^{\chi} - \partial_{\chi}h_{\alpha\beta}\,\partial^{\chi}h^{\alpha\beta})\Big)[t,\,x,\,y,\,z]\,dz\,dy\,dx\,dt$$

$$\begin{array}{c|cc} & h^{\#1}_{0^+} & h^{\#2}_{0^+} \\ \hline h^{\#1}_{0^+}{}^{\dagger} & -2\,\beta+\alpha\,k^2 & -\sqrt{3}\;\beta \\ h^{\#2}_{0^+}{}^{\dagger} & -\sqrt{3}\;\beta & 0 \end{array}$$

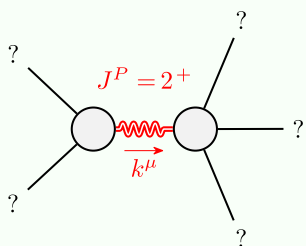
$$\begin{array}{c|c} & \mathcal{T}^{\#1}_{2^+}{}_{\alpha\beta} \\ \hline \mathcal{T}^{\#1}_{2^+}{}^{\dagger\,\alpha\beta} & \dfrac{1}{\beta-\frac{\alpha\,k^2}{2}} \end{array} \qquad \begin{array}{c|c} & h^{\#1}_{2^+}{}_{\alpha\beta} \\ \hline h^{\#1}_{2^+}{}^{\dagger\,\alpha\beta} & \beta-\frac{\alpha\,k^2}{2} \end{array}$$

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

(No source constraints)

$$\begin{array}{c|c} & \mathcal{T}^{\#1}_{1^-}{}_{\alpha} \\ \hline \mathcal{T}^{\#1}_{1^-}{}^{\dagger\,\alpha} & \frac{1}{\beta} \end{array} \qquad \begin{array}{c|c} & h^{\#1}_{1^-}{}_{\alpha} \\ \hline h^{\#1}_{1^-}{}^{\dagger\,\alpha} & \beta \end{array}$$

Massive and massless spectra



Massive particle

Pole residue:	$-\frac{2}{\alpha} > 0$
Polarisations:	5
Square mass:	$\frac{2\,\beta}{\alpha} > 0$
Spin:	2
Parity:	Even

(No massless particles)

Unitarity conditions

$\alpha < 0 \;\&\&\; \beta < 0$