Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$$\mathcal{S} ==$$

$$\iiiint (\beta\, h_{\alpha\beta}\, h^{\alpha\beta} - \gamma\, h^{\alpha}{}_{\alpha}\, h^{\beta}{}_{\beta} + h^{\alpha\beta}\, \mathcal{T}_{\alpha\beta} + \tfrac{1}{2}\, \alpha\, (\partial_{\beta} h^{\chi}{}_{\chi} \partial^{\beta} h^{\alpha}{}_{\alpha} + 2\, \partial_{\alpha} h^{\alpha\beta}\, \partial_{\chi} h_{\beta}{}^{\chi} - 2$$

$$\partial^{\beta} h^{\alpha}{}_{\alpha} \partial_{\chi} h_{\beta}{}^{\chi} - \partial_{\chi} h_{\alpha\beta} \partial^{\chi} h^{\alpha\beta}))[t, x, y, z]\, dz\, dy\, dx\, dt$$

$\mathcal{T}_{0^+}^{\#1}$ $\mathcal{T}_{0^+}^{\#2}$ $h_{0^+}^{\#1}$ $h_{0^+}^{\#2}$ $\mathcal{T}_{2^+\,\alpha\beta}^{\#1}$

	$\mathcal{T}_{0^+}^{\#1}$	$\mathcal{T}_{0^+}^{\#2}$
$\mathcal{T}_{0^+}^{\#1}\dagger$	$\dfrac{1}{\frac{\beta(\beta-4\gamma)}{\beta-\gamma}+\alpha k^2}$	$\dfrac{\sqrt{3}\,\gamma}{\beta(\beta-4\gamma)+\alpha(\beta-\gamma)k^2}$
$\mathcal{T}_{0^+}^{\#2}\dagger$	$\dfrac{\sqrt{3}\,\gamma}{\beta(\beta-4\gamma)+\alpha(\beta-\gamma)k^2}$	$\dfrac{1}{\beta+\gamma\left(-1-\frac{3\gamma}{\beta-3\gamma+\alpha k^2}\right)}$

	$h_{0^+}^{\#1}$	$h_{0^+}^{\#2}$
$h_{0^+}^{\#1}\dagger$	$\beta - 3\gamma + \alpha k^2$	$-\sqrt{3}\,\gamma$
$h_{0^+}^{\#2}\dagger$	$-\sqrt{3}\,\gamma$	$\beta - \gamma$

	$\mathcal{T}_{2^+\,\alpha\beta}^{\#1}$
$\mathcal{T}_{2^+}^{\#1}\dagger^{\alpha\beta}$	$\dfrac{1}{\beta-\frac{\alpha k^2}{2}}$

	$h_{1^-\,\alpha}^{\#1}$
$\mathcal{T}_{1^-}^{\#1}\dagger^{\alpha}$	$\dfrac{1}{\beta}$
$h_{1^-}^{\#1}\dagger^{\alpha}$	β

	$h_{2^+\,\alpha\beta}^{\#1}$
$h_{2^+}^{\#1}\dagger^{\alpha\beta}$	$\beta - \dfrac{\alpha k^2}{2}$

(No source constraints)

Massive and massless spectra

Massive particle

Pole residue:	$\dfrac{\beta^2 - 2\beta\gamma + 4\gamma^2}{\alpha(\beta-\gamma)^2} > 0$
Polarisations:	1
Square mass:	$-\dfrac{\beta(\beta-4\gamma)}{\alpha(\beta-\gamma)} > 0$
Spin:	0
Parity:	Even

$J^P = 0^+$ $\vec{k}^{\mu}$

$J^P = 2^+$ k^{μ}

(No massless particles)

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

Unitarity conditions

(Unitarity is demonstrably impossible)