Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$S_F ==$

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

Source constraints/gauge generators

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

$\mathcal{T}_{0^+}^{\#1}$ †, $\mathcal{T}_{0^+}^{\#2}$ †

$\frac{1}{\sqrt{3}\,\alpha k^2}$	0
$-\frac{4}{3\,\alpha k^2}$	$\frac{1}{\sqrt{3}\,\alpha k^2}$

$h_{1^-}^{\#1\,\alpha}$

$h_{1^-}^{\#1}$ †	
α	0

	$h_{0^+}^{\#1}$	$h_{0^+}^{\#2}$
$h_{0^+}^{\#1}$ †	$4\,\alpha k^2$	$\sqrt{3}\,\alpha k^2$
$h_{0^+}^{\#2}$ †	$\sqrt{3}\,\alpha k^2$	0

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

$\frac{1}{\alpha k^2}$

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

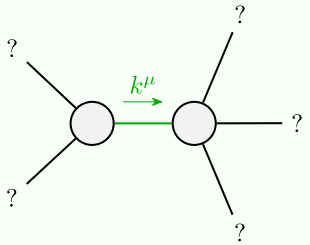
$h_{2^+}^{\#1\,\alpha\beta}$

$h_{2^+}^{\#1}$ †	
$\alpha\beta$	αk^2

$\mathcal{T}_{1^-}^{\#1\,\alpha}$

$\mathcal{T}_{1^-}^{\#1}$ †	
α	0

Massive and massless spectra



Quadratic pole

Pole residue:	$\frac{1}{\alpha} > 0$
Polarisations:	3

(No massive particles)

Unitarity conditions

$\alpha > 0$