PSALTer results panel

$$\mathcal{S} == \iiiint \Big(\rho\,\varphi + h^{\alpha\beta}\,\mathcal{T}_{\alpha\beta} + \tfrac{1}{2}\,\alpha_{2}\,\partial_{\alpha}\varphi\,\partial^{\alpha}\varphi + \tfrac{1}{8}\,\alpha_{1}\,(36\,(1+2\,\varphi)\,\partial_{\alpha}\partial^{\alpha}\varphi - 12\,\partial_{\alpha}h^{\beta}{}_{\beta}\,\partial^{\alpha}\varphi + 18\,\partial_{\alpha}\varphi\,\partial^{\alpha}\varphi + 12\,\partial^{\alpha}\varphi\,\partial_{\beta}h_{\alpha}{}^{\beta} - 4\,\partial_{\beta}\partial_{\alpha}h^{\alpha\beta} + 4\,\partial_{\beta}\partial^{\beta}h^{\alpha}{}_{\alpha} - \partial_{\beta}h^{\chi}{}_{\chi}\,\partial^{\beta}h^{\alpha}{}_{\alpha} + 2\,\partial^{\beta}h^{\alpha}{}_{\alpha}\,\partial_{\chi}h_{\beta}{}^{\chi} - 2\,\partial_{\beta}h_{\alpha\chi}\,\partial^{\chi}h^{\alpha\beta} + \partial_{\chi}h_{\alpha\beta}\,\partial^{\chi}h^{\alpha\beta}) -$$

$$\alpha_{6}\,(12\,\partial_{\beta}\partial_{\alpha}h^{\chi}{}_{\chi}\,\partial^{\beta}\partial^{\alpha}\varphi + 36\,\partial_{\beta}\partial_{\alpha}\varphi\,\partial^{\beta}\partial^{\alpha}\varphi - 12\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial_{\alpha}h_{\beta}{}^{\chi} - 12\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial_{\beta}h_{\alpha}{}^{\chi} + 12\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial^{\chi}h_{\alpha\beta} + 12\,\partial_{\alpha}\partial^{\alpha}\varphi\,(6\,\partial_{\beta}\partial^{\beta}\varphi - \partial_{\chi}\partial_{\beta}h^{\beta\chi} + \partial_{\chi}\partial^{\chi}h^{\beta}{}_{\beta}) + \partial_{\chi}\partial_{\beta}h^{\delta}{}_{\delta}\,\partial^{\chi}\partial^{\beta}h^{\alpha}{}_{\alpha} + 2\,\partial^{\chi}\partial_{\alpha}h^{\alpha\beta}\,\partial_{\delta}\partial_{\beta}h_{\chi}{}^{\delta} + 2\,\partial^{\chi}\partial_{\alpha}h^{\alpha\beta}\,\partial_{\delta}\partial_{\chi}h_{\beta}{}^{\delta} - 4\,\partial^{\chi}\partial^{\beta}h^{\alpha}{}_{\alpha}\,\partial_{\delta}\partial_{\chi}h_{\beta}{}^{\delta} + \partial_{\chi}\partial^{\chi}h^{\alpha\beta}\,\partial_{\delta}\partial^{\delta}h_{\alpha\beta} - 4\,\partial^{\chi}\partial_{\alpha}h^{\alpha\beta}\,\partial_{\delta}\partial^{\delta}h_{\beta\chi} + 2\,\partial^{\chi}\partial^{\beta}h^{\alpha}{}_{\alpha}\,\partial_{\delta}\partial^{\delta}h_{\beta\chi}) +$$

$$\alpha_{5}\,(9\,\partial_{\alpha}\partial^{\alpha}\varphi\,(9\,\partial_{\beta}\partial^{\beta}\varphi - 2\,\partial_{\chi}\partial_{\beta}h^{\beta\chi} + 2\,\partial_{\chi}\partial^{\chi}h^{\beta}{}_{\beta}) + \partial_{\beta}\partial_{\alpha}h^{\alpha\beta}\,\partial_{\delta}\partial_{\chi}h^{\chi\delta} + \partial_{\beta}\partial^{\beta}h^{\alpha}{}_{\alpha}\,(-2\,\partial_{\delta}\partial_{\chi}h^{\chi\delta} + \partial_{\delta}\partial^{\delta}h^{\chi}{}_{\chi})) + \alpha_{7}\,(9\,\partial_{\alpha}\partial^{\alpha}\varphi\,\partial_{\beta}\partial^{\beta}\varphi + 6\,\partial_{\beta}\partial_{\alpha}h^{\chi}{}_{\chi}\,\partial^{\beta}\partial^{\alpha}\varphi + 18\,\partial_{\beta}\partial_{\alpha}\varphi\,\partial^{\beta}\partial^{\alpha}\varphi - 6\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial_{\alpha}h_{\beta}{}^{\chi} - 6\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial_{\beta}h_{\alpha}{}^{\chi} + 6\,\partial^{\beta}\partial^{\alpha}\varphi\,\partial_{\chi}\partial^{\chi}h_{\alpha\beta} + \partial_{\beta}\partial_{\alpha}h_{\chi\delta}\,\partial^{\delta}\partial^{\chi}h^{\alpha\beta} - \partial_{\chi}\partial_{\beta}h_{\alpha\delta}\,\partial^{\delta}\partial^{\chi}h^{\alpha\beta} - \partial_{\delta}\partial_{\beta}h_{\alpha\chi}\,\partial^{\delta}\partial^{\chi}h^{\alpha\beta} + \partial_{\delta}\partial_{\chi}h_{\alpha\beta}\,\partial^{\delta}\partial^{\chi}h^{\alpha\beta})\Big)[t,x,y,z]\,dz\,dy\,dx\,dt$$

Wave operator

$$\begin{array}{c|ccc} & 0^{+}\,\varphi & 0^{+}\,h^{\perp} & 0^{+}\,h^{\parallel} \\ \hline 0^{+}\,\varphi^{\dagger} & \frac{1}{4}k^{2}(9\,\alpha_{1}+2\,(\alpha_{2}+54\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{2})) & 0 & -\frac{3}{4}\sqrt{3}\,k^{2}(\alpha_{1}-4\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{2}) \\ 0^{+}\,h^{\perp\dagger} & 0 & 0 & 0 \\ 0^{+}\,h^{\parallel\dagger} & -\frac{3}{4}\sqrt{3}\,k^{2}(\alpha_{1}-4\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{2}) & 0 & -\frac{\alpha_{1}k^{2}}{4}+(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{4} \end{array}$$

$$\begin{array}{c|c} & 1^{-}\,h^{\perp}{}_{\alpha} \\ \hline 1^{-}\,h^{\perp\dagger\alpha} & 0 \end{array}$$

$$\begin{array}{c|c} & 2^{+}\,h^{\parallel}{}_{\alpha\beta} \\ \hline 2^{+}\,h^{\parallel\dagger\alpha\beta} & \frac{\alpha_{1}k^{2}}{8}+(-\alpha_{6}+\alpha_{7})\,k^{4} \end{array}$$

Saturated propagator

$$\begin{array}{c|ccc} & 0^{+}\,\rho & 0^{+}\,\mathcal{T}^{\perp} & 0^{+}\,\mathcal{T}^{\parallel} \\ \hline 0^{+}\,\rho^{\dagger} & \frac{2}{(18\,\alpha_{1}+\alpha_{2})\,k^{2}} & 0 & -\frac{6\sqrt{3}}{(18\,\alpha_{1}+\alpha_{2})\,k^{2}} \\ 0^{+}\,\mathcal{T}^{\perp\dagger} & 0 & 0 & 0 \\ 0^{+}\,\mathcal{T}^{\parallel\dagger} & -\frac{6\sqrt{3}}{(18\,\alpha_{1}+\alpha_{2})\,k^{2}} & 0 & -\frac{2\,(9\,\alpha_{1}+2\,(\alpha_{2}+54\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{2}))}{(18\,\alpha_{1}+\alpha_{2})\,k^{2}\,(\alpha_{1}-4\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})\,k^{2})} \end{array}$$

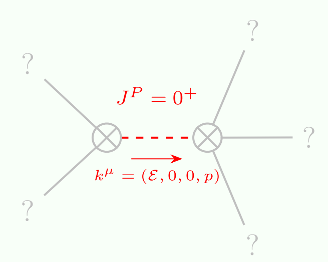
$$\begin{array}{c|c} & 1^{-}\,\mathcal{T}^{\perp}{}_{\alpha} \\ \hline 1^{-}\,\mathcal{T}^{\perp\dagger\alpha} & 0 \end{array}$$

$$\begin{array}{c|c} & 2^{+}\,\mathcal{T}^{\parallel}{}_{\alpha\beta} \\ \hline 2^{+}\,\mathcal{T}^{\parallel\dagger\alpha\beta} & \frac{8}{k^{2}(\alpha_{1}+8\,(-\alpha_{6}+\alpha_{7})\,k^{2})} \end{array}$$

Source constraints

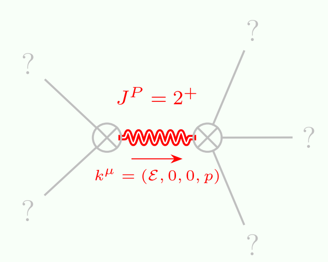
Spin-parity form	Covariant form	Multiplicities
$0^{+}\,\mathcal{T}^{\perp} == 0$	$\partial_{\beta}\partial_{\alpha}\mathcal{T}^{\alpha\beta} == 0$	1
$1^{-}\,\mathcal{T}^{\perp\alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\mathcal{T}^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\mathcal{T}^{\alpha\beta}$	3
Total expected gauge generators:		4

Massive spectrum



Massive particle

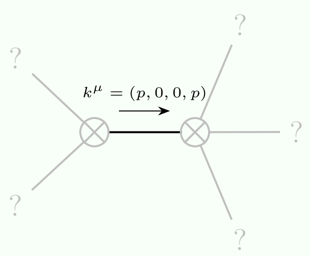
Pole residue:	$\frac{4}{\alpha_{1}} > 0$
Square mass:	$\frac{\alpha_{1}}{4\,(3\,\alpha_{5}-4\,\alpha_{6}+\alpha_{7})} > 0$
Spin:	0
Parity:	Even



Massive particle

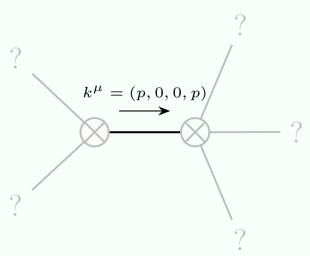
Pole residue:	$-\frac{8}{\alpha_{1}} > 0$
Square mass:	$\frac{\alpha_{1}}{8\,\alpha_{6}-8\,\alpha_{7}} > 0$
Spin:	2
Parity:	Even

Massless spectrum



Massless particle

Pole residue:	$\frac{p^{2}}{\alpha_{1}} > 0$
Polarisations:	2



Massless particle

Pole residue:	$\frac{1+18\,p^{2}}{18\,\alpha_{1}+\alpha_{2}} > 0$
Polarisations:	1

Unitarity conditions

(Demonstrably impossible)