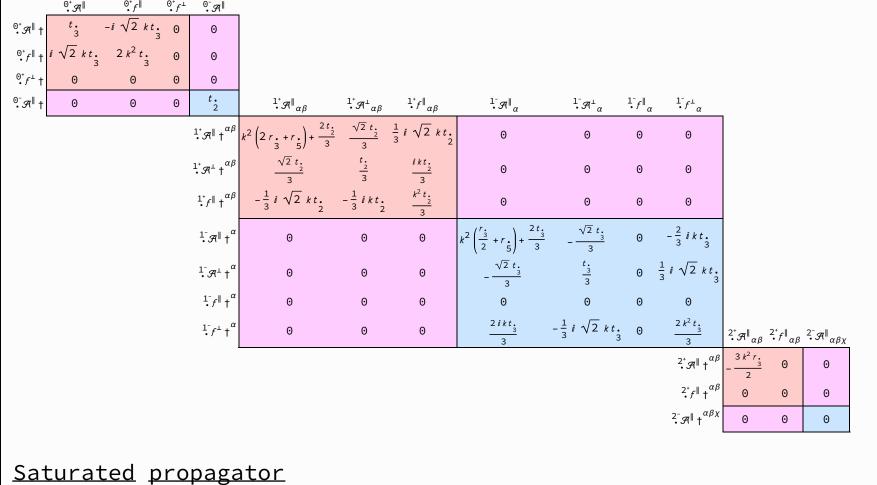
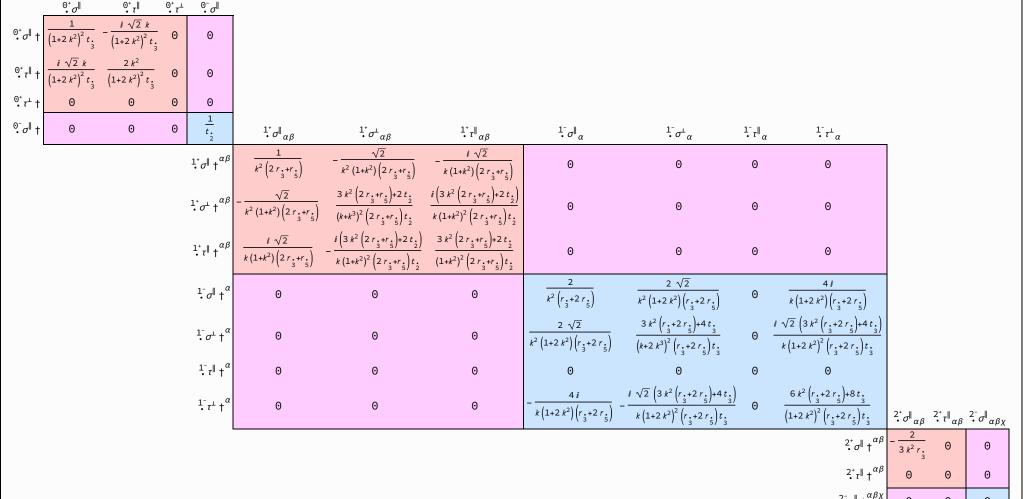
# PSALTer results panel

 $S = \iiint \left(\frac{1}{6}\left(-4t_{3}^{2}\mathcal{A}^{\alpha_{1}}_{\alpha}\mathcal{A}^{\beta_{1}}_{\theta}+6\mathcal{A}^{\alpha\beta\chi}\right) \sigma_{\alpha\beta\chi}+6f^{\alpha\beta}_{\alpha}\tau_{(\Delta+\mathcal{K})_{\alpha\beta}}+8t_{3}^{2}\mathcal{A}^{\beta_{1}}_{\alpha}\partial_{\beta}\mathcal{A}^{\alpha_{1}}_{\theta}-3r_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\theta}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-3r_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\theta}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-3r_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\theta}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-3r_{3}^{2}\partial_{\beta}\mathcal{A}^{\alpha\beta_{1}}_{\alpha}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-3r_{3}^{2}\partial_{\beta}\mathcal{A}^{\alpha\beta_{1}}_{\beta}+6r_{3}^{2}\partial_{\beta}\mathcal{A}^{\alpha\beta_{1}}_{\beta}+4t_{3}^{2}\partial_{\beta}\mathcal{A}^{\alpha_{1}}_{\beta}-8t_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-24r_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\beta}+6r_{5}^{2}\partial_{\beta}\mathcal{A}^{\alpha\beta_{1}}_{\beta}+4t_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-8t_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\beta}+6r_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\beta}+4t_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\alpha}-8t_{3}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\beta}+6r_{5}^{2}\partial_{\beta}\mathcal{A}^{\beta_{1}}_{\beta}+6r_{$ 

# <u>Wave</u> <u>operator</u>





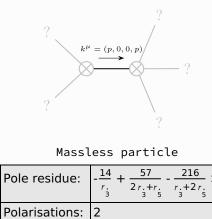
### Source constraints

Spin-parity form	Covariant form	Multiplicities
${\stackrel{\Theta^+}{\bullet}} \tau^{\perp} == \Theta$	$\partial_{\beta}\partial_{\alpha}\tau \left(\Delta+\mathcal{K}\right)^{\alpha\beta} = 0$	1
$-2 i k^{0^+} \sigma^{\parallel} + {}^{0^+} \tau^{\parallel} == 0$	$\partial_{\beta}\partial_{\alpha\tau} \left(\Delta + \mathcal{K}\right)^{\alpha\beta} = \partial_{\beta}\partial^{\beta}_{\tau} \left(\Delta + \mathcal{K}\right)^{\alpha}_{\alpha} + 2 \partial_{\chi}\partial^{\chi}\partial_{\beta}\sigma^{\alpha}_{\alpha}^{\beta}$	1
$2 i k \frac{1}{\cdot} \sigma^{\perp}^{\alpha} + \frac{1}{\cdot} \tau^{\perp}^{\alpha} = 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}_{\tau} \left(\Delta + \mathcal{K}\right)^{\beta\chi} = \partial_{\chi}\partial^{\chi}\partial_{\beta\tau} \left(\Delta + \mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\sigma}\partial^{\delta}\partial_{\chi}\partial_{\beta}\sigma^{\beta\alpha\chi}$	3
1- <sub>t</sub>    <sup>\alpha</sup> == 0	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}_{\tau} \left(\Delta + \mathcal{K}\right)^{\beta\chi} = \partial_{\chi}\partial^{\chi}\partial_{\beta\tau} \left(\Delta + \mathcal{K}\right)^{\beta\alpha}$	3
$i k  i \cdot \sigma^{\perp} \alpha^{\beta} + i \cdot \tau^{\parallel} \alpha^{\beta} = 0$	$\partial_{\chi}\partial^{\alpha}\tau \left(\Delta + \mathcal{K}\right)^{\beta\chi} + \partial_{\chi}\partial^{\beta}\tau \left(\Delta + \mathcal{K}\right)^{\chi\alpha} + \partial_{\chi}\partial^{\chi}\tau \left(\Delta + \mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\chi\beta\delta} + 2 \partial_{\delta}\partial^{\delta}\partial_{\chi}\sigma^{\chi\alpha\beta} = \partial_{\chi}\partial^{\alpha}\tau \left(\Delta + \mathcal{K}\right)^{\chi\beta} + \partial_{\chi}\partial^{\beta}\tau \left(\Delta + \mathcal{K}\right)^{\alpha\chi} + \partial_{\chi}\partial^{\chi}\tau \left(\Delta + \mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\chi\alpha\delta}$	3
$2^{-}_{\bullet}\sigma^{\parallel}{}^{\alpha\beta\chi} = 0$	$3 \partial_{\epsilon} \partial_{\delta} \partial^{\chi} \partial^{\alpha} \sigma^{\delta \beta \epsilon} + 3 \partial_{\epsilon} \partial^{\epsilon} \partial^{\chi} \partial^{\alpha} \sigma^{\delta \beta}_{\delta} + 2 \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\beta} \sigma^{\alpha \chi \delta} + 4 \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\beta} \sigma^{\chi \alpha \delta} + 2 \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\beta} \sigma^{\delta \alpha \chi} +$	5
	$2  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\chi} \sigma^{\beta \alpha \delta} + 4  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\chi} \sigma^{\delta \alpha \beta} + 2  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta} \sigma^{\alpha \beta \chi} + 3  \eta^{\beta \chi}  \partial_{\phi} \partial^{\phi} \partial_{\epsilon} \partial^{\alpha} \sigma^{\delta}_{       $	
	$3  \partial_{\epsilon} \partial_{\delta} \partial^{\chi} \partial^{\beta} \sigma^{\delta \alpha \epsilon} + 3  \partial_{\epsilon} \partial^{\epsilon} \partial^{\chi} \partial^{\beta} \sigma^{\delta \alpha}_{ \delta} + 2  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\alpha} \sigma^{\beta \chi \delta} + 4  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\alpha} \sigma^{\chi \beta \delta} + 2  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\alpha} \sigma^{\delta \beta \chi} + 2  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\chi} \sigma^{\alpha \beta \delta} +$	
	$2 \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta} \sigma^{\beta \alpha \chi} + 4 \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta} \sigma^{\chi \alpha \beta} + 3 \eta^{\alpha \chi} \partial_{\phi} \partial^{\phi} \partial_{\epsilon} \partial^{\beta} \sigma^{\delta}_{\delta} + 3 \eta^{\beta \chi} \partial_{\phi} \partial^{\phi} \partial_{\epsilon} \partial_{\delta} \sigma^{\delta \alpha \epsilon} + 3 \eta^{\alpha \chi} \partial_{\phi} \partial^{\phi} \partial_{\epsilon} \partial^{\epsilon} \sigma^{\delta \beta}_{\delta}$	
2 <sup>+</sup> <sub>τ</sub>    <sup>αβ</sup> == 0	$4  \partial_{\delta} \partial_{\chi} \partial^{\beta} \partial^{\alpha}_{\tau}  (\Delta + \mathcal{K})^{\chi \delta} + 2  \partial_{\delta} \partial^{\delta} \partial^{\beta} \partial^{\alpha}_{\tau}  (\Delta + \mathcal{K})^{\chi}_{\chi} + 3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\chi}_{\tau}  (\Delta + \mathcal{K})^{\alpha \beta} + 3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\chi}_{\tau}  (\Delta + \mathcal{K})^{\beta \alpha} + 2  \eta^{\alpha \beta}  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial_{\chi \tau}  (\Delta + \mathcal{K})^{\chi \delta} = 0$	5
	$3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\alpha}_{\tau}  (\Delta + \mathcal{K})^{\beta \chi} + 3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\alpha}_{\tau}  (\Delta + \mathcal{K})^{\chi \beta} + 3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\beta}_{\tau}  (\Delta + \mathcal{K})^{\alpha \chi} + 3  \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\beta}_{\tau}  (\Delta + \mathcal{K})^{\chi \alpha} + 2  \eta^{\alpha \beta}  \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta}_{\tau}  (\Delta + \mathcal{K})^{\chi}_{\chi}$	
Total expected gauge generators:		21

### <u>Massive</u> <u>spectrum</u>

(There are no massive particles)

## <u>Massless</u> <u>spectrum</u>



# <u>Gauge</u> <u>symmetries</u>

(Not yet implemented in PSALTer)

### <u>Unitarity</u> <u>conditions</u>

 $\left(r_{3} < 0 \&\&\left(r_{5} < -\frac{r_{3}}{2} || r_{5} > -2 r_{3}\right)\right) ||\left(r_{3} > 0 \&\& -2 r_{3} < r_{5} < -\frac{r_{3}}{2}\right)$ 

### <u>Validity</u> assumptions

(Not yet implemented in PSALTer)