PSALTer results panel

$$\mathcal{S} == \iiiint \Big(\tfrac{1}{6}\big(2 t_1 \mathcal{A}^{\alpha\iota}{}_{\alpha} \mathcal{A}_{\iota}{}^{\theta}{}_{\theta} + 6 \mathcal{A}^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + 6 f^{\alpha\beta} \tau(\Delta+\mathcal{K})_{\alpha\beta} - 4 t_1 \mathcal{A}_{\alpha}{}^{\theta}{}_{\theta} \partial_{\iota} f^{\alpha\iota} + 4 t_1 \mathcal{A}_{\iota}{}^{\theta}{}_{\theta} \partial^{\iota} f^{\alpha}{}_{\alpha} - 2 t_1 \partial_{\iota} f^{\theta}{}_{\theta} \partial^{\iota} f^{\alpha}{}_{\alpha} - 2 t_1 \partial_{\iota} f^{\alpha\iota} \partial_{\theta} f_{\alpha}{}^{\theta} + 4 t_1 \partial^{\iota} f^{\alpha}{}_{\alpha}$$
$$\partial_{\theta} f_{\iota}{}^{\theta} + 8 r_2 \partial_{\beta}\mathcal{A}_{\alpha\iota\theta} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} - 4 r_2 \partial_{\beta}\mathcal{A}_{\alpha\theta\iota} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} + 4 r_2 \partial_{\beta}\mathcal{A}_{\iota\theta\alpha} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} - 2 r_2 \partial_{\iota}\mathcal{A}_{\alpha\beta\theta} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} +$$
$$2 r_2 \partial_{\theta}\mathcal{A}_{\alpha\beta\iota} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} - 4 r_2 \partial_{\theta}\mathcal{A}_{\alpha\iota\beta} \partial^{\theta}\mathcal{A}^{\alpha\beta\iota} + 6 r_5 \partial_{\iota}\mathcal{A}_{\theta}{}^{\kappa}{}_{\kappa} \partial^{\theta}\mathcal{A}^{\alpha\iota}{}_{\alpha} - 6 r_5 \partial_{\theta}\mathcal{A}_{\iota}{}^{\kappa}{}_{\kappa} \partial^{\theta}\mathcal{A}^{\alpha\iota}{}_{\alpha} - 6 t_1 \partial_{\alpha} f_{\iota\theta} \partial^{\theta} f^{\alpha\iota} -$$
$$3 t_1 \partial_{\alpha} f_{\theta\iota} \partial^{\theta} f^{\alpha\iota} + 3 t_1 \partial_{\iota} f_{\alpha\theta} \partial^{\theta} f^{\alpha\iota} + 3 t_1 \partial_{\theta} f_{\alpha\iota} \partial^{\theta} f^{\alpha\iota} + 3 t_1 \partial_{\theta} f_{\iota\alpha} \partial^{\theta} f^{\alpha\iota} + 6 t_1 \mathcal{A}_{\alpha\theta\iota} (\mathcal{A}^{\alpha\iota\theta} + 2 \partial^{\theta} f^{\alpha\iota}) -$$
$$6 r_5 \partial_{\alpha}\mathcal{A}^{\alpha\iota\theta} \partial_{\kappa}\mathcal{A}_{\iota}{}^{\kappa}{}_{\theta} + 12 r_5 \partial^{\theta}\mathcal{A}^{\alpha\iota}{}_{\alpha} \partial_{\kappa}\mathcal{A}_{\iota}{}^{\kappa}{}_{\theta} + 6 r_5 \partial_{\alpha}\mathcal{A}^{\alpha\iota\theta} \partial_{\kappa}\mathcal{A}_{\theta}{}^{\kappa}{}_{\iota} - 12 r_5 \partial^{\theta}\mathcal{A}^{\alpha\iota}{}_{\alpha} \partial_{\kappa}\mathcal{A}_{\theta}{}^{\kappa}{}_{\iota}\big)\Big)[t, x, y, z]\, dz\, dy\, dx\, dt$$

Wave operator

	$0^+ \mathcal{A}^{\parallel}$	$0^+ f^{\parallel}$	$0^+ f^{\perp}$	$0^- \mathcal{A}^{\parallel}$
$0^+ \mathcal{A}^{\parallel}\dagger$	0	0	0	0
$0^+ f^{\parallel}\dagger$	0	0	0	0
$0^+ f^{\perp}\dagger$	0	0	0	0
$0^- \mathcal{A}^{\parallel}\dagger$	0	0	0	$k^2 r_2 - t_1$

	$1^+ \mathcal{A}^{\parallel}{}_{\alpha\beta}$	$1^+ \mathcal{A}^{\perp}{}_{\alpha\beta}$	$1^+ f^{\parallel}{}_{\alpha\beta}$	$1^- \mathcal{A}^{\parallel}{}_{\alpha}$	$1^- \mathcal{A}^{\perp}{}_{\alpha}$	$1^- f^{\parallel}{}_{\alpha}$	$1^- f^{\perp}{}_{\alpha}$
$1^+ \mathcal{A}^{\parallel}\dagger^{\alpha\beta}$	$k^2 r_5 - \frac{t_1}{2}$	$-\frac{t_1}{\sqrt{2}}$	$-\frac{i k t_1}{\sqrt{2}}$	0	0	0	0
$1^+ \mathcal{A}^{\perp}\dagger^{\alpha\beta}$	$-\frac{t_1}{\sqrt{2}}$	0	0	0	0	0	0
$1^+ f^{\parallel}\dagger^{\alpha\beta}$	$\frac{i k t_1}{\sqrt{2}}$	0	0	0	0	0	0
$1^- \mathcal{A}^{\parallel}\dagger^{\alpha}$	0	0	0	$k^2 r_5 + \frac{t_1}{6}$	$\frac{t_1}{3\sqrt{2}}$	0	$\frac{i k t_1}{3}$
$1^- \mathcal{A}^{\perp}\dagger^{\alpha}$	0	0	0	$\frac{t_1}{3\sqrt{2}}$	$\frac{t_1}{3}$	0	$\frac{1}{3} i \sqrt{2}\, k t_1$
$1^- f^{\parallel}\dagger^{\alpha}$	0	0	0	0	0	0	0
$1^- f^{\perp}\dagger^{\alpha}$	0	0	0	$-\frac{1}{3} i k t_1$	$-\frac{1}{3} i \sqrt{2}\, k t_1$	0	$\frac{2 k^2 t_1}{3}$

	$2^+ \mathcal{A}^{\parallel}{}_{\alpha\beta}$	$2^+ f^{\parallel}{}_{\alpha\beta}$	$2^- \mathcal{A}^{\parallel}{}_{\alpha\beta\chi}$
$2^+ \mathcal{A}^{\parallel}\dagger^{\alpha\beta}$	$\frac{t_1}{2}$	$-\frac{i k t_1}{\sqrt{2}}$	0
$2^+ f^{\parallel}\dagger^{\alpha\beta}$	$\frac{i k t_1}{\sqrt{2}}$	$k^2 t_1$	0
$2^- \mathcal{A}^{\parallel}\dagger^{\alpha\beta\chi}$	0	0	$\frac{t_1}{2}$

Saturated propagator

	$0^+ \sigma^{\parallel}$	$0^+ \tau^{\parallel}$	$0^+ \tau^{\perp}$	$0^- \sigma^{\parallel}$
$0^+ \sigma^{\parallel}\dagger$	0	0	0	0
$0^+ \tau^{\parallel}\dagger$	0	0	0	0
$0^+ \tau^{\perp}\dagger$	0	0	0	0
$0^- \sigma^{\parallel}\dagger$	0	0	0	$\frac{1}{k^2 r_2 - t_1}$

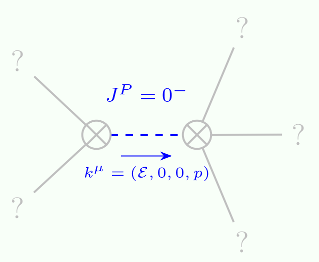
	$1^+ \sigma^{\parallel}{}_{\alpha\beta}$	$1^+ \sigma^{\perp}{}_{\alpha\beta}$	$1^+ \tau^{\parallel}{}_{\alpha\beta}$	$1^- \sigma^{\parallel}{}_{\alpha}$	$1^- \sigma^{\perp}{}_{\alpha}$	$1^- \tau^{\parallel}{}_{\alpha}$	$1^- \tau^{\perp}{}_{\alpha}$
$1^+ \sigma^{\parallel}\dagger^{\alpha\beta}$	0	$-\frac{\sqrt{2}}{t_1 + k^2 t_1}$	$-\frac{i \sqrt{2}\, k}{t_1 + k^2 t_1}$	0	0	0	0
$1^+ \sigma^{\perp}\dagger^{\alpha\beta}$	$-\frac{\sqrt{2}}{t_1 + k^2 t_1}$	$\frac{-2 k^2 r_5 + t_1}{(1+k^2)^2 t_1^2}$	$-\frac{i (2 k^3 r_5 - k t_1)}{(1+k^2)^2 t_1^2}$	0	0	0	0
$1^+ \tau^{\parallel}\dagger^{\alpha\beta}$	$\frac{i \sqrt{2}\, k}{t_1 + k^2 t_1}$	$\frac{i (2 k^3 r_5 - k t_1)}{(1+k^2)^2 t_1^2}$	$\frac{-2 k^4 r_5 + k^2 t_1}{(1+k^2)^2 t_1^2}$	0	0	0	0
$1^- \sigma^{\parallel}\dagger^{\alpha}$	0	0	0	$\frac{1}{k^2 r_5}$	$-\frac{1}{\sqrt{2}\,(k^2 r_5 + 2 k^4 r_5)}$	0	$-\frac{i}{k r_5 + 2 k^3 r_5}$
$1^- \sigma^{\perp}\dagger^{\alpha}$	0	0	0	$-\frac{1}{\sqrt{2}\,(k^2 r_5 + 2 k^4 r_5)}$	$\frac{6 k^2 r_5 + t_1}{2 (k + 2 k^3)^2 r_5 t_1}$	0	$\frac{i (6 k^2 r_5 + t_1)}{\sqrt{2}\, k (1 + 2 k^2)^2 r_5 t_1}$
$1^- \tau^{\parallel}\dagger^{\alpha}$	0	0	0	0	0	0	0
$1^- \tau^{\perp}\dagger^{\alpha}$	0	0	0	$\frac{i}{k r_5 + 2 k^3 r_5}$	$-\frac{i (6 k^2 r_5 + t_1)}{\sqrt{2}\, k (1 + 2 k^2)^2 r_5 t_1}$	0	$\frac{6 k^2 r_5 + t_1}{(1 + 2 k^2)^2 r_5 t_1}$

	$2^+ \sigma^{\parallel}{}_{\alpha\beta}$	$2^+ \tau^{\parallel}{}_{\alpha\beta}$	$2^- \sigma^{\parallel}{}_{\alpha\beta\chi}$
$2^+ \sigma^{\parallel}\dagger^{\alpha\beta}$	$\frac{2}{(1+2k^2)^2 t_1}$	$-\frac{2 i \sqrt{2}\, k}{(1+2k^2)^2 t_1}$	0
$2^+ \tau^{\parallel}\dagger^{\alpha\beta}$	$\frac{2 i \sqrt{2}\, k}{(1+2k^2)^2 t_1}$	$\frac{4 k^2}{(1+2k^2)^2 t_1}$	0
$2^- \sigma^{\parallel}\dagger^{\alpha\beta\chi}$	0	0	$\frac{2}{t_1}$

Source constraints

Spin-parity form	Covariant form	Multiplicities
$0^+ \tau^{\perp} == 0$	$\partial_{\beta}\partial_{\alpha}\tau(\Delta+\mathcal{K})^{\alpha\beta} == 0$	1
$0^+ \tau^{\parallel} == 0$	$\partial_{\beta}\partial_{\alpha}\tau(\Delta+\mathcal{K})^{\alpha\beta} == \partial_{\beta}\partial^{\beta}\tau(\Delta+\mathcal{K})^{\alpha}{}_{\alpha}$	1
$0^+ \sigma^{\parallel} == 0$	$\partial_{\beta}\sigma^{\alpha}{}_{\alpha}{}^{\beta} == 0$	1
$2 i k\, 1^- \sigma^{\perp\alpha} + 1^- \tau^{\perp\alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau(\Delta+\mathcal{K})^{\alpha\beta} + 2\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial_{\beta}\sigma^{\beta\alpha\chi}$	3
$1^- \tau^{\parallel\alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau(\Delta+\mathcal{K})^{\beta\alpha}$	3
$i k\, 1^+ \sigma^{\perp\alpha\beta} + 1^+ \tau^{\parallel\alpha\beta} == 0$	$\partial_{\chi}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\beta\chi} + \partial_{\chi}\partial^{\beta}\tau(\Delta+\mathcal{K})^{\chi\alpha} + \partial_{\chi}\partial^{\chi}\tau(\Delta+\mathcal{K})^{\alpha\beta} + 2\partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\chi\beta\delta} + 2\partial_{\delta}\partial^{\delta}\partial_{\chi}\sigma^{\chi\alpha\beta} ==$ $\partial_{\chi}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\chi\beta} + \partial_{\chi}\partial^{\beta}\tau(\Delta+\mathcal{K})^{\alpha\chi} + \partial_{\chi}\partial^{\chi}\tau(\Delta+\mathcal{K})^{\beta\alpha} + 2\partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\chi\alpha\delta}$	3
$-2 i k\, 2^+ \sigma^{\parallel\alpha\beta} + 2^+ \tau^{\parallel\alpha\beta} == 0$	$-i(4\partial_{\delta}\partial_{\chi}\partial^{\beta}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\chi\delta} + 2\partial_{\delta}\partial^{\delta}\partial^{\beta}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\chi}{}_{\chi} - 3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\beta\chi} -$ $3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\alpha}\tau(\Delta+\mathcal{K})^{\chi\beta} - 3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\beta}\tau(\Delta+\mathcal{K})^{\alpha\chi} - 3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\beta}\tau(\Delta+\mathcal{K})^{\chi\alpha} +$ $3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\chi}\tau(\Delta+\mathcal{K})^{\alpha\beta} + 3\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\chi}\tau(\Delta+\mathcal{K})^{\beta\alpha} + 4 i\, k^{\chi}\, \partial_{\epsilon}\partial_{\chi}\partial^{\beta}\partial^{\alpha}\sigma^{\delta}{}_{\delta}{}^{\epsilon} -$ $6 i\, k^{\chi}\, \partial_{\epsilon}\partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\delta\beta\epsilon} - 6 i\, k^{\chi}\, \partial_{\epsilon}\partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\delta\alpha\epsilon} + 6 i\, k^{\chi}\, \partial_{\epsilon}\partial^{\epsilon}\partial_{\delta}\partial_{\chi}\sigma^{\alpha\beta\delta} + 6 i\, k^{\chi}\, \partial_{\epsilon}\partial^{\epsilon}\partial_{\delta}\partial_{\chi}\sigma^{\beta\alpha\delta} +$ $2\,\eta^{\alpha\beta}\, \partial_{\epsilon}\partial^{\epsilon}\partial_{\delta}\partial_{\chi}\tau(\Delta+\mathcal{K})^{\chi\delta} - 2\,\eta^{\alpha\beta}\, \partial_{\epsilon}\partial^{\epsilon}\partial_{\delta}\partial^{\delta}\tau(\Delta+\mathcal{K})^{\chi}{}_{\chi} - 4 i\, \eta^{\alpha\beta}\, k^{\chi}\, \partial_{\phi}\partial^{\phi}\partial_{\epsilon}\partial_{\chi}\sigma^{\delta}{}_{\delta}{}^{\epsilon}) == 0$	5
Total expected gauge generators:		17

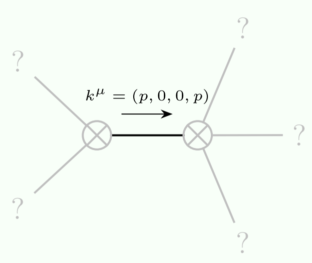
Massive spectrum



Massive particle

Pole residue:	$-\frac{1}{r_2} > 0$
Square mass:	$\frac{t_1}{r_2} > 0$
Spin:	0
Parity:	Odd

Massless spectrum



Massless particle

Pole residue:	$-\frac{7}{r_5} - \frac{2 p^2}{t_1} - \frac{4 r_5 p^4}{t_1^2} > 0$
Polarisations:	2

Unitarity conditions

$r_2 < 0 \,\&\&\, t_1 < 0 \,\&\&\, r_5 < 0$