PSALTer results panel

$$S == \int\int\int\int \left(\frac{1}{6} \left(-4\, t_{3}\, \mathcal{A}^{\alpha\, \prime}{}_{\alpha}\, \mathcal{A}_{\prime}{}^{\theta}{}_{\theta} + 6\, \mathcal{A}^{\alpha\beta\chi}\, \sigma_{\alpha\beta\chi} + 6\, f^{\alpha\beta}\, \tau_{(\Delta+\mathcal{K})\alpha\beta} + 8\, t_{3}\, \mathcal{A}_{\alpha}{}^{\theta}{}_{\theta}\, \partial_{\prime} f^{\alpha\, \prime} - 12\, r_{1}\, \partial_{\beta} \mathcal{A}_{\prime}{}^{\theta}{}_{\theta}\, \partial^{\prime} \mathcal{A}^{\alpha\beta}{}_{\alpha} + 12\, r_{1}\, \partial_{\prime} \mathcal{A}_{\beta}{}^{\theta}{}_{\theta}\, \partial^{\prime} \mathcal{A}^{\alpha\beta}{}_{\alpha} - \right.$$
$$8\, t_{3}\, \mathcal{A}_{\prime}{}^{\theta}{}_{\theta}\, \partial^{\prime} f^{\alpha}{}_{\alpha} + 4\, t_{3}\, \partial_{\prime} f^{\theta}{}_{\theta}\, \partial^{\prime} f^{\alpha}{}_{\alpha} + 12\, r_{1}\, \partial_{\alpha} \mathcal{A}^{\alpha\beta\, \prime}\, \partial_{\theta} \mathcal{A}_{\beta}{}^{\theta}{}_{\prime} - 24\, r_{1}\, \partial^{\prime} \mathcal{A}^{\alpha\beta}{}_{\alpha}\, \partial_{\theta} \mathcal{A}_{\beta}{}^{\theta}{}_{\prime} - 12\, r_{1}\, \partial_{\alpha} \mathcal{A}^{\alpha\beta\, \prime}\, \partial_{\theta} \mathcal{A}_{\prime}{}^{\theta}{}_{\beta} + 24\, r_{1}\, \partial^{\prime} \mathcal{A}^{\alpha\beta}{}_{\alpha}\, \partial_{\theta} \mathcal{A}_{\prime}{}^{\theta}{}_{\beta} +$$
$$4\, t_{3}\, \partial_{\prime} f^{\alpha\, \prime}\, \partial_{\theta} f_{\alpha}{}^{\theta} - 8\, t_{3}\, \partial^{\prime} f^{\alpha}{}_{\alpha}\, \partial_{\theta} f_{\prime}{}^{\theta} - 8\, r_{1}\, \partial_{\beta} \mathcal{A}_{\alpha\, \prime\, \theta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 8\, r_{2}\, \partial_{\beta} \mathcal{A}_{\alpha\, \prime\, \theta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 4\, r_{1}\, \partial_{\beta} \mathcal{A}_{\alpha\theta\, \prime}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} - 4\, r_{2}\, \partial_{\beta} \mathcal{A}_{\alpha\theta\, \prime}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} -$$
$$16\, r_{1}\, \partial_{\beta} \mathcal{A}_{\prime\, \theta\alpha}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 4\, r_{2}\, \partial_{\beta} \mathcal{A}_{\prime\, \theta\alpha}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} - 4\, r_{1}\, \partial_{\prime} \mathcal{A}_{\alpha\beta\theta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} - 2\, r_{2}\, \partial_{\prime} \mathcal{A}_{\alpha\beta\theta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 4\, r_{1}\, \partial_{\theta} \mathcal{A}_{\alpha\beta\, \prime}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} +$$
$$2\, r_{2}\, \partial_{\theta} \mathcal{A}_{\alpha\beta\, \prime}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 4\, r_{1}\, \partial_{\theta} \mathcal{A}_{\alpha\, \prime\, \beta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} - 4\, r_{2}\, \partial_{\theta} \mathcal{A}_{\alpha\, \prime\, \beta}\, \partial^{\theta} \mathcal{A}^{\alpha\beta\, \prime} + 4\, t_{2}\, \mathcal{A}_{\prime\theta\alpha}\, \partial^{\theta} f^{\alpha\, \prime} + 2\, t_{2}\, \partial_{\alpha} f_{\prime\theta}\, \partial^{\theta} f^{\alpha\, \prime} - t_{2}\, \partial_{\alpha} f_{\theta\, \prime}\, \partial^{\theta} f^{\alpha\, \prime} -$$
$$\left. t_{2}\, \partial_{\prime} f_{\alpha\theta}\, \partial^{\theta} f^{\alpha\, \prime} + t_{2}\, \partial_{\theta} f_{\alpha\, \prime}\, \partial^{\theta} f^{\alpha\, \prime} - t_{2}\, \partial_{\theta} f_{\prime\alpha}\, \partial^{\theta} f^{\alpha\, \prime} - 4\, t_{2}\, \mathcal{A}_{\alpha\theta\, \prime} \left(\mathcal{A}^{\alpha\, \prime\, \theta} + \partial^{\theta} f^{\alpha\, \prime} \right) + 2\, t_{2}\, \mathcal{A}_{\alpha\, \prime\, \theta} \left(\mathcal{A}^{\alpha\, \prime\, \theta} + 2\, \partial^{\theta} f^{\alpha\, \prime} \right) \right) \right] [t, x, y, z]\, dz\, dy\, dx\, dt$$

Wave operator

	$0^{+}_{\cdot} \mathcal{A}^{\parallel}$	$0^{+}_{\cdot} f^{\parallel}$	$0^{+}_{\cdot} f^{\perp}$	$0^{-}_{\cdot} \mathcal{A}^{\parallel}$
$0^{+}_{\cdot} \mathcal{A}^{\parallel}\, \dagger$	t_{3}	$-i \sqrt{2}\, k\, t_{3}$	0	0
$0^{+}_{\cdot} f^{\parallel}\, \dagger$	$i \sqrt{2}\, k\, t_{3}$	$2\, k^{2}\, t_{3}$	0	0
$0^{+}_{\cdot} f^{\perp}\, \dagger$	0	0	0	0
$0^{-}_{\cdot} \mathcal{A}^{\parallel}\, \dagger$	0	0	0	$k^{2}\, r_{2} + t_{2}$

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

	$2^{+}_{\cdot} \mathcal{A}^{\parallel}{}_{\alpha\beta}$	$2^{+}_{\cdot} f^{\parallel}{}_{\alpha\beta}$	$2^{-}_{\cdot} \mathcal{A}^{\parallel}{}_{\alpha\beta\chi}$
$2^{+}_{\cdot} \mathcal{A}^{\parallel}\, \dagger^{\alpha\beta}$	0	0	0
$2^{+}_{\cdot} f^{\parallel}\, \dagger^{\alpha\beta}$	0	0	0
$2^{-}_{\cdot} \mathcal{A}^{\parallel}\, \dagger^{\alpha\beta\chi}$	0	0	$k^{2}\, r_{1}$

Saturated propagator

	$0^{+}_{\cdot} \sigma^{\parallel}$	$0^{+}_{\cdot} \tau^{\parallel}$	$0^{+}_{\cdot} \tau^{\perp}$	$0^{-}_{\cdot} \sigma^{\parallel}$
$0^{+}_{\cdot} \sigma^{\parallel}\, \dagger$	$\frac{1}{\left(1+2\, k^{2}\right)^{2} t_{3}}$	$-\frac{i \sqrt{2}\, k}{\left(1+2\, k^{2}\right)^{2} t_{3}}$	0	0
$0^{+}_{\cdot} \tau^{\parallel}\, \dagger$	$\frac{i \sqrt{2}\, k}{\left(1+2\, k^{2}\right)^{2} t_{3}}$	$\frac{2\, k^{2}}{\left(1+2\, k^{2}\right)^{2} t_{3}}$	0	0
$0^{+}_{\cdot} \tau^{\perp}\, \dagger$	0	0	0	0
$0^{-}_{\cdot} \sigma^{\parallel}\, \dagger$	0	0	0	$\frac{1}{k^{2}\, r_{2} + t_{2}}$

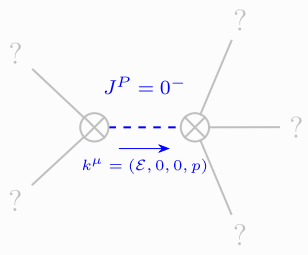
	$1^{+}_{\cdot} \sigma^{\parallel}{}_{\alpha\beta}$	$1^{+}_{\cdot} \sigma^{\perp}{}_{\alpha\beta}$	$1^{+}_{\cdot} \tau^{\parallel}{}_{\alpha\beta}$	$1^{-}_{\cdot} \sigma^{\parallel}{}_{\alpha}$	$1^{-}_{\cdot} \sigma^{\perp}{}_{\alpha}$	$1^{-}_{\cdot} \tau^{\parallel}{}_{\alpha}$	$1^{-}_{\cdot} \tau^{\perp}{}_{\alpha}$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

	$2^{+}_{\cdot} \sigma^{\parallel}{}_{\alpha\beta}$	$2^{+}_{\cdot} \tau^{\parallel}{}_{\alpha\beta}$	$2^{-}_{\cdot} \sigma^{\parallel}{}_{\alpha\beta\chi}$
$2^{+}_{\cdot} \sigma^{\parallel}\, \dagger^{\alpha\beta}$	0	0	0
$2^{+}_{\cdot} \tau^{\parallel}\, \dagger^{\alpha\beta}$	0	0	0
$2^{-}_{\cdot} \sigma^{\parallel}\, \dagger^{\alpha\beta\chi}$	0	0	$\frac{1}{k^{2}\, r_{1}}$

Source constraints

Spin-parity form	Covariant form	Multiplicities
$0^{+}_{\cdot} \tau^{\perp} == 0$	$\partial_{\beta} \partial_{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\beta} == 0$	1
$-2\, i\, k\, 0^{+}_{\cdot} \sigma^{\parallel} + 0^{+}_{\cdot} \tau^{\parallel} == 0$	$\partial_{\beta} \partial_{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\beta} == \partial_{\beta} \partial^{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\alpha}{}_{\alpha} + 2\, \partial_{\chi} \partial^{\chi} \partial_{\beta} \sigma^{\alpha\ \ \beta}_{\ \alpha}$	1
$2\, i\, k\, 1^{-}_{\cdot} \sigma^{\perp}{}^{\alpha} + 1^{-}_{\cdot} \tau^{\perp}{}^{\alpha} == 0$	$\partial_{\chi} \partial_{\beta} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\beta\chi} == \partial_{\chi} \partial^{\chi} \partial_{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\beta} + 2\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial_{\beta} \sigma^{\beta\alpha\chi}$	3
$1^{-}_{\cdot} \tau^{\parallel}{}^{\alpha} == 0$	$\partial_{\chi} \partial_{\beta} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\beta\chi} == \partial_{\chi} \partial^{\chi} \partial_{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\beta\alpha}$	3
$i\, k\, 1^{+}_{\cdot} \sigma^{\parallel}{}^{\alpha\beta} + 1^{+}_{\cdot} \tau^{\parallel}{}^{\alpha\beta} == 0$	$\partial_{\chi} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\beta\chi} + \partial_{\chi} \partial^{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\chi\alpha} + \partial_{\chi} \partial^{\chi} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\beta} + \partial_{\delta} \partial_{\chi} \partial^{\beta} \sigma^{\chi\alpha\delta} + \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\alpha\beta\chi} ==$ $\partial_{\chi} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\chi\beta} + \partial_{\chi} \partial^{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\chi} + \partial_{\chi} \partial^{\chi} \tau_{(\Delta+\mathcal{K})}{}^{\beta\alpha} + \partial_{\delta} \partial_{\chi} \partial^{\alpha} \sigma^{\chi\beta\delta} + \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\beta\alpha\chi}$	3
$1^{+}_{\cdot} \sigma^{\parallel}{}^{\alpha\beta} == 1^{+}_{\cdot} \sigma^{\perp}{}^{\alpha\beta}$	$3\, \partial_{\delta} \partial_{\chi} \partial^{\alpha} \sigma^{\chi\beta\delta} + \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\beta\alpha\chi} + 2\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\chi\alpha\beta} == 3\, \partial_{\delta} \partial_{\chi} \partial^{\beta} \sigma^{\chi\alpha\delta} + \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\alpha\beta\chi}$	3
$2^{+}_{\cdot} \tau^{\parallel}{}^{\alpha\beta} == 0$	$4\, \partial_{\delta} \partial_{\chi} \partial^{\beta} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\chi\delta} + 2\, \partial_{\delta} \partial^{\delta} \partial^{\beta} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\chi}{}_{\chi} + 3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\chi} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\beta} +$ $3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\chi} \tau_{(\Delta+\mathcal{K})}{}^{\beta\alpha} + 2\, \eta^{\alpha\beta}\, \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial_{\chi} \tau_{(\Delta+\mathcal{K})}{}^{\chi\delta} == 3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\beta\chi} +$ $3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\alpha} \tau_{(\Delta+\mathcal{K})}{}^{\chi\beta} + 3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\alpha\chi} + 3\, \partial_{\delta} \partial^{\delta} \partial_{\chi} \partial^{\beta} \tau_{(\Delta+\mathcal{K})}{}^{\chi\alpha} + 2\, \eta^{\alpha\beta}\, \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta} \tau_{(\Delta+\mathcal{K})}{}^{\chi}{}_{\chi}$	5
$2^{+}_{\cdot} \sigma^{\parallel}{}^{\alpha\beta} == 0$	$3\, \partial_{\delta} \partial_{\chi} \partial^{\alpha} \sigma^{\chi\beta\delta} + 3\, \partial_{\delta} \partial_{\chi} \partial^{\beta} \sigma^{\chi\alpha\delta} + 2\, \eta^{\alpha\beta}\, \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \sigma^{\chi}{}_{\chi}{}^{\delta} == 2\, \partial_{\delta} \partial^{\beta} \partial^{\alpha} \sigma^{\chi}{}_{\chi}{}^{\delta} + 3 \left(\partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\alpha\beta\chi} + \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\beta\alpha\chi} \right)$	5
Total expected gauge generators:		24

Massive spectrum



Massive particle

Pole residue:	$-\frac{1}{r_{2}} > 0$
Square mass:	$-\frac{t_{2}}{r_{2}} > 0$
Spin:	0
Parity:	Odd

Massless spectrum

(There are no massless particles)

Gauge symmetries

(Not yet implemented in PSALTer)

Unitarity conditions

$r_{2} < 0 \,\&\&\, t_{2} > 0$

Validity assumptions

(Not yet implemented in PSALTer)