PSALTer results panel

$$\mathcal{S} == \int\int\int\int (\frac{1}{16} (-8\, a_{0}\, \mathcal{A}_{\alpha\chi\beta}\, \mathcal{A}^{\alpha\beta\chi} + 8\, a_{0}\, \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta}\, \mathcal{A}^{\chi}{}_{\beta\chi} + 16\, \mathcal{A}^{\alpha\beta\chi}\, \mathcal{W}_{\alpha\beta\chi} + 16\, \mathcal{T}^{\alpha\beta}\, h_{\alpha\beta} + 8\, a_{0}\, h^{\alpha\beta}\, \partial_{\beta}\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi} - 8\, a_{0}\, h^{\alpha\beta}\, \partial_{\chi}\mathcal{A}_{\alpha}{}^{\chi}{}_{\beta} - 4\, a_{0}\, h^{\alpha}{}_{\alpha}\, \partial_{\chi}\mathcal{A}^{\beta}{}_{\beta}{}^{\chi} + 4\, a_{0}\, h^{\alpha}{}_{\alpha}\, \partial_{\chi}\mathcal{A}^{\beta\chi}{}_{\beta} + h_{4}\, \partial_{\beta}\mathcal{A}_{\chi}{}^{\delta}{}_{\delta}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 2\, h_{4}\, \partial_{\beta}\mathcal{A}^{\delta}{}_{\chi\delta}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - h_{4}\, \partial_{\chi}\mathcal{A}_{\beta}{}^{\delta}{}_{\delta}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} + 2\, h_{4}\, \partial_{\chi}\mathcal{A}^{\delta}{}_{\beta\delta}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} + h_{4}\, \partial_{\beta}\mathcal{A}^{\delta}{}_{\chi\delta}\, \partial^{\chi}\mathcal{A}^{\alpha\beta}{}_{\alpha} - h_{4}\, \partial_{\chi}\mathcal{A}^{\delta}{}_{\beta\delta}\, \partial^{\chi}\mathcal{A}^{\alpha\beta}{}_{\alpha} + h_{4}\, \partial_{\alpha}\mathcal{A}^{\alpha\beta\chi}\, \partial_{\delta}\mathcal{A}_{\beta\chi}{}^{\delta} + 2\, h_{4}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta}\, \partial_{\delta}\mathcal{A}_{\beta\chi}{}^{\delta} - 2\, h_{4}\, \partial^{\chi}\mathcal{A}^{\alpha\beta}{}_{\alpha}\, \partial_{\delta}\mathcal{A}_{\beta\chi}{}^{\delta} - h_{4}\, \partial_{\alpha}\mathcal{A}^{\alpha\beta\chi}\, \partial_{\delta}\mathcal{A}_{\chi\beta}{}^{\delta} - 2\, h_{4}\, \partial^{\chi}\mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta}\, \partial_{\delta}\mathcal{A}_{\chi\beta}{}^{\delta} + 2\, h_{4}\, \partial^{\chi}\mathcal{A}^{\alpha\beta}{}_{\alpha}\, \partial_{\delta}\mathcal{A}_{\chi\beta}{}^{\delta}))[t, x, y, z]\, dt\, dz\, dy\, dx\, dt$$

Wave operator

	$0^+_{.} h^{\perp}$	$0^+_{.} h^{\parallel}$	$0^+_{.} \mathcal{A}_{s}{}^{\perp t}$	$0^+_{.} \mathcal{A}_{s}{}^{\parallel}$	$0^+_{.} \mathcal{A}_{s}{}^{\perp h}$
$0^+_{.} h^{\perp}\, \dagger$	0	0	0	$\frac{i\, a_{0}\, k}{4}$	$\frac{i\, a_{0}\, k}{8\, \sqrt{2}}$
$0^+_{.} h^{\parallel}\, \dagger$	0	0	0	$-\frac{i\, a_{0}\, k}{4\, \sqrt{3}}$	$\frac{5\, i\, a_{0}\, k}{8\, \sqrt{6}}$
$0^+_{.} \mathcal{A}_{s}{}^{\perp t}\, \dagger$	0	0	0	$\frac{a_{0}}{2}$	$\frac{a_{0}}{4\, \sqrt{2}}$
$0^+_{.} \mathcal{A}_{s}{}^{\parallel}\, \dagger$	$-\frac{1}{4}\, i\, a_{0}\, k$	$\frac{i\, a_{0}\, k}{4\, \sqrt{3}}$	$\frac{a_{0}}{2}$	0	$\frac{a_{0}}{4\, \sqrt{2}}$
$0^+_{.} \mathcal{A}_{s}{}^{\perp h}\, \dagger$	$-\frac{i\, a_{0}\, k}{8\, \sqrt{2}}$	$-\frac{5\, i\, a_{0}\, k}{8\, \sqrt{6}}$	$\frac{a_{0}}{4\, \sqrt{2}}$	$\frac{a_{0}}{4\, \sqrt{2}}$	$-\frac{a_{0}}{4}$

	$1^+_{.} \mathcal{A}_{s}{}^{\perp}{}_{\alpha\beta}$	$1^-_{.} h^{\perp}{}_{\alpha}$	$1^-_{.} \mathcal{A}_{s}{}^{\perp t}{}_{\alpha}$	$1^-_{.} \mathcal{A}_{s}{}^{\parallel t}{}_{\alpha}$	$1^-_{.} \mathcal{A}_{s}{}^{\perp h}{}_{\alpha}$	$1^-_{.} \mathcal{A}_{s}{}^{\parallel h}{}_{\alpha}$
$1^+_{.} \mathcal{A}_{s}{}^{\perp}\, \dagger^{\alpha\beta}$	$\frac{1}{16}\, (4\, a_{0} - k^2\, h_{4})$	0	0	0	0	0
$1^-_{.} h^{\perp}\, \dagger^{\alpha}$	0	0	$-\frac{i\, a_{0}\, k}{4\, \sqrt{6}}$	$\frac{1}{4}\, i\, \sqrt{\frac{5}{6}}\, a_{0}\, k$	$\frac{i\, a_{0}\, k}{8\, \sqrt{3}}$	$-\frac{i\, a_{0}\, k}{4\, \sqrt{6}}$
$1^-_{.} \mathcal{A}_{s}{}^{\perp t}\, \dagger^{\alpha}$	0	$\frac{i\, a_{0}\, k}{4\, \sqrt{6}}$	$-\frac{a_{0}}{3}$	$\frac{\sqrt{5}\, a_{0}}{6}$	$\frac{a_{0}}{12\, \sqrt{2}}$	$\frac{a_{0}}{12}$
$1^-_{.} \mathcal{A}_{s}{}^{\parallel t}\, \dagger^{\alpha}$	0	$-\frac{1}{4}\, i\, \sqrt{\frac{5}{6}}\, a_{0}\, k$	$\frac{\sqrt{5}\, a_{0}}{6}$	$\frac{a_{0}}{3}$	$\frac{1}{12}\, \sqrt{\frac{5}{2}}\, a_{0}$	$\frac{\sqrt{5}\, a_{0}}{12}$
$1^-_{.} \mathcal{A}_{s}{}^{\perp h}\, \dagger^{\alpha}$	0	$-\frac{i\, a_{0}\, k}{8\, \sqrt{3}}$	$\frac{a_{0}}{12\, \sqrt{2}}$	$\frac{1}{12}\, \sqrt{\frac{5}{2}}\, a_{0}$	$\frac{a_{0}}{12}$	$-\frac{a_{0}}{3\, \sqrt{2}}$
$1^-_{.} \mathcal{A}_{s}{}^{\parallel h}\, \dagger^{\alpha}$	0	$\frac{i\, a_{0}\, k}{4\, \sqrt{6}}$	$\frac{a_{0}}{12}$	$\frac{\sqrt{5}\, a_{0}}{12}$	$-\frac{a_{0}}{3\, \sqrt{2}}$	$\frac{1}{48}\, (-4\, a_{0} - 9\, k^2\, h_{4})$

	$2^+_{.} h^{\parallel}{}_{\alpha\beta}$	$2^+_{.} \mathcal{A}_{s}{}^{\parallel}{}_{\alpha\beta}$	$2^+_{.} \mathcal{A}_{s}{}^{\perp}{}_{\alpha\beta}$	$2^-_{.} \mathcal{A}_{s}{}^{\parallel}{}_{\alpha\beta\chi}$
$2^+_{.} h^{\parallel}\, \dagger^{\alpha\beta}$	0	$-\frac{i\, a_{0}\, k}{4\, \sqrt{3}}$	$-\frac{i\, a_{0}\, k}{2\, \sqrt{6}}$	0
$2^+_{.} \mathcal{A}_{s}{}^{\parallel}\, \dagger^{\alpha\beta}$	$\frac{i\, a_{0}\, k}{4\, \sqrt{3}}$	$-\frac{a_{0}}{2}$	0	0
$2^+_{.} \mathcal{A}_{s}{}^{\perp}\, \dagger^{\alpha\beta}$	$\frac{i\, a_{0}\, k}{2\, \sqrt{6}}$	0	$\frac{a_{0}}{4}$	0
$2^-_{.} \mathcal{A}_{s}{}^{\parallel}\, \dagger^{\alpha\beta\chi}$	0	0	0	$\frac{a_{0}}{4}$

	$3^-_{.} \mathcal{A}_{s}{}^{\parallel}{}_{\alpha\beta\chi}$
$3^-_{.} \mathcal{A}_{s}{}^{\parallel}\, \dagger^{\alpha\beta\chi}$	$-\frac{a_{0}}{2}$

Saturated propagator

	$0^+_{.} \mathcal{T}^{\perp}$	$0^+_{.} \mathcal{T}^{\parallel}$	$0^+_{.} \mathcal{W}_{s}{}^{\perp t}$	$0^+_{.} \mathcal{W}_{s}{}^{\parallel}$	$0^+_{.} \mathcal{W}_{s}{}^{\perp h}$
$0^+_{.} \mathcal{T}^{\perp}\, \dagger$	$-\frac{4\, k^2}{3\, a_{0}\, (4+k^2)^2}$	0	$-\frac{8\, i\, k}{3\, a_{0}\, (4+k^2)^2}$	$\frac{10\, i\, k}{12\, a_{0}+3\, a_{0}\, k^2}$	$\frac{4\, i\, \sqrt{2}\, k}{12\, a_{0}+3\, a_{0}\, k^2}$
$0^+_{.} \mathcal{T}^{\parallel}\, \dagger$	0	$\frac{4}{a_{0}\, k^2}$	0	$-\frac{2\, i}{\sqrt{3}\, a_{0}\, k}$	$\frac{4\, i\, \sqrt{\frac{2}{3}}}{a_{0}\, k}$
$0^+_{.} \mathcal{W}_{s}{}^{\perp t}\, \dagger$	$\frac{8\, i\, k}{3\, a_{0}\, (4+k^2)^2}$	0	$-\frac{16}{3\, a_{0}\, (4+k^2)^2}$	$\frac{20}{12\, a_{0}+3\, a_{0}\, k^2}$	$\frac{8\, \sqrt{2}}{12\, a_{0}+3\, a_{0}\, k^2}$
$0^+_{.} \mathcal{W}_{s}{}^{\parallel}\, \dagger$	$-\frac{10\, i\, k}{12\, a_{0}+3\, a_{0}\, k^2}$	$\frac{2\, i}{\sqrt{3}\, a_{0}\, k}$	$\frac{20}{12\, a_{0}+3\, a_{0}\, k^2}$	0	0
$0^+_{.} \mathcal{W}_{s}{}^{\perp h}\, \dagger$	$-\frac{4\, i\, \sqrt{2}\, k}{12\, a_{0}+3\, a_{0}\, k^2}$	$-\frac{4\, i\, \sqrt{\frac{2}{3}}}{a_{0}\, k}$	$\frac{8\, \sqrt{2}}{12\, a_{0}+3\, a_{0}\, k^2}$	0	0

	$1^+_{.} \mathcal{W}_{s}{}^{\perp}{}_{\alpha\beta}$	$1^-_{.} \mathcal{T}^{\perp}{}_{\alpha}$	$1^-_{.} \mathcal{W}_{s}{}^{\perp t}{}_{\alpha}$	$1^-_{.} \mathcal{W}_{s}{}^{\parallel t}{}_{\alpha}$	$1^-_{.} \mathcal{W}_{s}{}^{\perp h}{}_{\alpha}$	$1^-_{.} \mathcal{W}_{s}{}^{\parallel h}{}_{\alpha}$
$1^+_{.} \mathcal{W}_{s}{}^{\perp}\, \dagger^{\alpha\beta}$	$\frac{16}{4\, a_{0} - k^2\, h_{4}}$	0	0	0	0	0
$1^-_{.} \mathcal{T}^{\perp}\, \dagger^{\alpha}$	0	$\frac{24\, a_{0}\, k^2 + 26\, k^4\, h_{4}}{a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{2\, i\, \sqrt{\frac{2}{3}}\, k\, (12\, a_{0}\, (1+k^2) + k^2\, (5+9\, k^2)\, h_{4})}{a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{i\, \sqrt{30}\, k\, (4\, a_{0} - k^2\, h_{4})}{a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{2\, i\, k\, (12\, a_{0}\, (4+k^2) + k^2\, (44+9\, k^2)\, h_{4})}{\sqrt{3}\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{16\, i\, \sqrt{6}\, k}{(2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$
$1^-_{.} \mathcal{W}_{s}{}^{\perp t}\, \dagger^{\alpha}$	0	$\frac{2\, i\, \sqrt{\frac{2}{3}}\, k\, (12\, a_{0}\, (1+k^2) + k^2\, (5+9\, k^2)\, h_{4})}{a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{4\, (4\, a_{0}\, (13+10\, k^2+k^4) + k^2\, (3-2\, k^2-5\, k^4)\, h_{4})}{3\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{2\, \sqrt{5}\, (4\, a_{0}\, (5+k^2) + 3\, k^2\, (1+k^2)\, h_{4})}{3\, a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{2\, \sqrt{2}\, (4\, a_{0}\, (4+k^2+k^4) - k^2\, (12+29\, k^2+5\, k^4)\, h_{4})}{3\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{32\, (1+2\, k^2)}{3\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$
$1^-_{.} \mathcal{W}_{s}{}^{\parallel t}\, \dagger^{\alpha}$	0	$\frac{i\, \sqrt{30}\, k\, (-4\, a_{0} + k^2\, h_{4})}{a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{2\, \sqrt{5}\, (4\, a_{0}\, (5+k^2) + 3\, k^2\, (1+k^2)\, h_{4})}{3\, a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{3}{a_{0}} - \frac{80}{36\, a_{0} + 3\, k^2\, h_{4}}$	$-\frac{\sqrt{10}\, (4\, a_{0}\, (-4+k^2) + 3\, k^2\, (4+k^2)\, h_{4})}{3\, a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{16\, \sqrt{5}}{36\, a_{0} + 3\, k^2\, h_{4}}$
$1^-_{.} \mathcal{W}_{s}{}^{\perp h}\, \dagger^{\alpha}$	0	$-\frac{2\, i\, k\, (12\, a_{0}\, (4+k^2) + k^2\, (44+9\, k^2)\, h_{4})}{\sqrt{3}\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{2\, \sqrt{2}\, (4\, a_{0}\, (4+k^2+k^4) - k^2\, (12+29\, k^2+5\, k^4)\, h_{4})}{3\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{\sqrt{10}\, (4\, a_{0}\, (-4+k^2) + 3\, k^2\, (4+k^2)\, h_{4})}{3\, a_{0}\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{-8\, a_{0}\, (-32-8\, k^2+k^4) + 2\, k^2\, (4+k^2)\, (36+5\, k^2)\, h_{4}}{3\, a_{0}\, (2+k^2)^2\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{32\, \sqrt{2}\, (5+k^2)}{3\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$
$1^-_{.} \mathcal{W}_{s}{}^{\parallel h}\, \dagger^{\alpha}$	0	$\frac{16\, i\, \sqrt{6}\, k}{(2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{32\, (1+2\, k^2)}{3\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$\frac{16\, \sqrt{5}}{36\, a_{0} + 3\, k^2\, h_{4}}$	$-\frac{32\, \sqrt{2}\, (5+k^2)}{3\, (2+k^2)\, (12\, a_{0} + k^2\, h_{4})}$	$-\frac{16}{36\, a_{0} + 3\, k^2\, h_{4}}$

	$2^+_{.} \mathcal{T}^{\parallel}{}_{\alpha\beta}$	$2^+_{.} \mathcal{W}_{s}{}^{\parallel}{}_{\alpha\beta}$	$2^+_{.} \mathcal{W}_{s}{}^{\perp}{}_{\alpha\beta}$	$2^-_{.} \mathcal{W}_{s}{}^{\parallel}{}_{\alpha\beta\chi}$
$2^+_{.} \mathcal{T}^{\parallel}\, \dagger^{\alpha\beta}$	$-\frac{8}{a_{0}\, k^2}$	$\frac{4\, i}{\sqrt{3}\, a_{0}\, k}$	$-\frac{8\, i\, \sqrt{\frac{2}{3}}}{a_{0}\, k}$	0
$2^+_{.} \mathcal{W}_{s}{}^{\parallel}\, \dagger^{\alpha\beta}$	$-\frac{4\, i}{\sqrt{3}\, a_{0}\, k}$	$-\frac{8}{3\, a_{0}}$	$\frac{4\, \sqrt{2}}{3\, a_{0}}$	0
$2^+_{.} \mathcal{W}_{s}{}^{\perp}\, \dagger^{\alpha\beta}$	$\frac{8\, i\, \sqrt{\frac{2}{3}}}{a_{0}\, k}$	$\frac{4\, \sqrt{2}}{3\, a_{0}}$	$-\frac{4}{3\, a_{0}}$	0
$2^-_{.} \mathcal{W}_{s}{}^{\parallel}\, \dagger^{\alpha\beta\chi}$	0	0	0	$\frac{4}{a_{0}}$

	$3^-_{.} \mathcal{W}_{s}{}^{\parallel}{}_{\alpha\beta\chi}$
$3^-_{.} \mathcal{W}_{s}{}^{\parallel}\, \dagger^{\alpha\beta\chi}$	$-\frac{2}{a_{0}}$

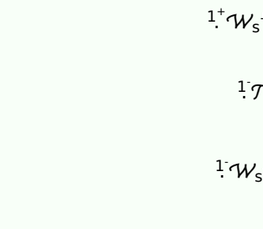
Source constraints

Spin-parity form	Covariant form	Multiplicities
$k\, {}^{0^+}_{.}\mathcal{W}_{s}{}^{\perp t} + 2\, i\, {}^{0^+}_{.}\mathcal{T}^{\perp} == 0$	$2\, \partial_{\beta}\partial_{\alpha}\mathcal{T}^{\alpha\beta} == \partial_{\chi}\partial_{\beta}\partial_{\alpha}\mathcal{W}^{\alpha\beta\chi}$	1
$2\, k\, {}^{1^-}_{.}\mathcal{W}_{s}{}^{\perp h\alpha} + k\, {}^{1^-}_{.}\mathcal{W}_{s}{}^{\perp t\alpha} + 6\, i\, {}^{1^-}_{.}\mathcal{T}^{\perp\alpha} == 0$	$2\, \partial_{\chi}\partial_{\beta}\partial^{\alpha}\mathcal{T}^{\beta\chi} + \partial_{\delta}\partial^{\delta}\partial_{\chi}\partial_{\beta}\mathcal{W}^{\beta\alpha\chi} == 2\, \partial_{\chi}\partial^{\chi}\partial_{\beta}\mathcal{T}^{\alpha\beta} + \partial_{\delta}\partial_{\chi}\partial_{\beta}\partial^{\alpha}\mathcal{W}^{\beta\chi\delta}$	3
Total expected gauge generators:		4

Massive spectrum

Massive particle

Pole residue:	$-\frac{16}{h_{4}} > 0$
Square mass:	$\frac{4\, a_{0}}{h_{4}} > 0$
Spin:	1
Parity:	Even



Massive particle

Pole residue:	$\frac{960\, a_{0} - 304\, h_{4}}{6\, a_{0}\, h_{4} - h_{4}^2} > 0$
Square mass:	$-\frac{12\, a_{0}}{h_{4}} > 0$
Spin:	1
Parity:	Odd

Massless spectrum

Massless particle

Pole residue:	$-\frac{p^2}{a_{0}} > 0$
Polarisations:	2

Unitarity conditions

(Demonstrably impossible)