PSALTer results panel

$$\mathcal{S} == \iiiint\Big(\tfrac{1}{16}\big(-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}\big)\Big)[t,\, x,\, y,\, z]\, 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	$\frac{a_{0}}{4\sqrt{2}}$
${}^{0^+}\mathcal{A}_s{}^{\perp h}\dagger$	$-\frac{i a_{0} k}{8\sqrt{2}}$	$-\frac{5 i a_{0} k}{8\sqrt{6}}$	$\frac{a_{0}}{4\sqrt{2}}$	$\frac{a_{0}}{4\sqrt{2}}$	$-\frac{a_{0}}{4}$

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

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

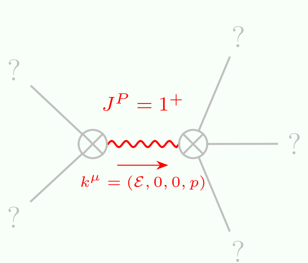
	${}^{2^+}\mathcal{T}^{\parallel}{}_{\alpha\beta}$	${}^{2^+}\mathcal{W}_s{}^{\parallel}{}_{\alpha\beta}$	${}^{2^+}\mathcal{W}_s{}^{\perp}{}_{\alpha\beta}$	${}^{2^-}\mathcal{W}_s{}^{\parallel}{}_{\alpha\beta\chi}$
${}^{2^+}\mathcal{T}^{\parallel}\dagger^{\alpha\beta}$	$-\frac{8}{a_{0} k^2}$	$\frac{4 i}{\sqrt{3}\,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

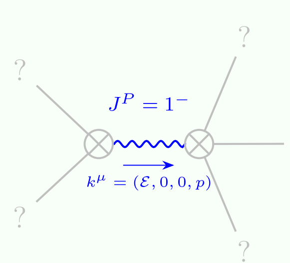
Spin-parity form	Covariant form	Multiplicities
$k\, {}^{0^+}\mathcal{W}_s{}^{\perp t} + 2 i\, {}^{0^+}\mathcal{T}^{\perp} == 0$	$2\, \partial_{\beta}\partial_{\alpha}\mathcal{T}^{\alpha\beta} == \partial_{\chi}\partial_{\beta}\partial_{\alpha}\mathcal{W}^{\alpha\beta\chi}$	1
$2 k\, {}^{1^-}\mathcal{W}_s{}^{\perp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

Massive spectrum



Massive particle

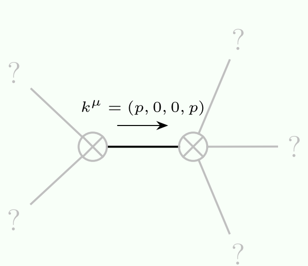
Pole residue:	$-\frac{16}{h_{4}} > 0$
Square mass:	$\frac{4 a_{0}}{h_{4}} > 0$
Spin:	1
Parity:	Even



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)