PSALTer results panel

$$\mathcal{S} == \iiiint \Big(\mathcal{A}^{\alpha\beta\chi}\ \sigma_{\alpha\beta\chi} + f^{\alpha\beta}\ \tau\,(\Delta+\mathcal{K})_{\alpha\beta} + 2\,\beta_{1}\Big(-\mathcal{A}_{\alpha\chi\beta}\,\mathcal{A}^{\alpha\beta\chi} + \big(2\,\mathcal{A}_{\beta\chi\alpha} - \partial_{\alpha}f_{\chi\beta} + \partial_{\chi}f_{\alpha\beta}\big)\partial^{\chi}f^{\alpha\beta} + \mathcal{A}_{\alpha\beta\chi}\big(\mathcal{A}^{\alpha\beta\chi} + 2\,\partial^{\chi}f^{\alpha\beta}\big)\Big) + 2\,\alpha_{1}\big(-\partial_{\chi}\mathcal{A}_{\alpha\beta\delta} + \partial_{\delta}\mathcal{A}_{\alpha\beta\chi}\big)\partial^{\delta}\mathcal{A}^{\alpha\beta\chi}\Big)[t,x,y,z]\,dz\,dy\,dx\,dt$$

Wave operator

	${}^{0^+}\mathcal{A}^{\parallel}$	${}^{0^+}f^{\parallel}$	${}^{0^+}f^{\perp}$	${}^{0^-}\mathcal{A}^{\parallel}$
${}^{0^+}\mathcal{A}^{\parallel}\dagger$	$\beta_1 + 2\alpha_1 k^2$	$-i\sqrt{2}\,\beta_1 k$	0	0
${}^{0^+}f^{\parallel}\dagger$	$i\sqrt{2}\,\beta_1 k$	$2\beta_1 k^2$	0	0
${}^{0^+}f^{\perp}\dagger$	0	0	0	0
${}^{0^-}\mathcal{A}^{\parallel}\dagger$	0	0	0	$4\beta_1 + 2\alpha_1 k^2$

	${}^{1^+}\mathcal{A}^{\parallel}{}_{\alpha\beta}$	${}^{1^+}\mathcal{A}^{\perp}{}_{\alpha\beta}$	${}^{1^+}f^{\parallel}{}_{\alpha\beta}$	${}^{1^-}\mathcal{A}^{\parallel}{}_{\alpha}$	${}^{1^-}\mathcal{A}^{\perp}{}_{\alpha}$	${}^{1^-}f^{\parallel}{}_{\alpha}$	${}^{1^-}f^{\perp}{}_{\alpha}$
${}^{1^+}\mathcal{A}^{\parallel}\dagger^{\alpha\beta}$	$3\beta_1 + 2\alpha_1 k^2$	$\sqrt{2}\,\beta_1$	$i\sqrt{2}\,\beta_1 k$	0	0	0	0
${}^{1^+}\mathcal{A}^{\perp}\dagger^{\alpha\beta}$	$\sqrt{2}\,\beta_1$	$2\beta_1$	$2i\beta_1 k$	0	0	0	0
${}^{1^+}f^{\parallel}\dagger^{\alpha\beta}$	$-i\sqrt{2}\,\beta_1 k$	$-2i\beta_1 k$	$2\beta_1 k^2$	0	0	0	0
${}^{1^-}\mathcal{A}^{\parallel}\dagger^{\alpha}$	0	0	0	$\beta_1 + 2\alpha_1 k^2$	0	0	0
${}^{1^-}\mathcal{A}^{\perp}\dagger^{\alpha}$	0	0	0	0	β_1	0	$i\sqrt{2}\,\beta_1 k$
${}^{1^-}f^{\parallel}\dagger^{\alpha}$	0	0	0	0	0	0	0
${}^{1^-}f^{\perp}\dagger^{\alpha}$	0	0	0	0	$-i\sqrt{2}\,\beta_1 k$	0	$2\beta_1 k^2$

	${}^{2^+}\mathcal{A}^{\parallel}{}_{\alpha\beta}$	${}^{2^+}f^{\parallel}{}_{\alpha\beta}$	${}^{2^-}\mathcal{A}^{\parallel}{}_{\alpha\beta\chi}$
${}^{2^+}\mathcal{A}^{\parallel}\dagger^{\alpha\beta}$	$\beta_1 + 2\alpha_1 k^2$	$-i\sqrt{2}\,\beta_1 k$	0
${}^{2^+}f^{\parallel}\dagger^{\alpha\beta}$	$i\sqrt{2}\,\beta_1 k$	$2\beta_1 k^2$	0
${}^{2^-}\mathcal{A}^{\parallel}\dagger^{\alpha\beta\chi}$	0	0	$\beta_1 + 2\alpha_1 k^2$

Saturated propagator

	${}^{0^+}\sigma^{\parallel}$	${}^{0^+}\tau^{\parallel}$	${}^{0^+}\tau^{\perp}$	${}^{0^-}\sigma^{\parallel}$
${}^{0^+}\sigma^{\parallel}\dagger$	$\frac{1}{2\alpha_1 k^2}$	$\frac{i}{2\sqrt{2}\,\alpha_1 k^3}$	0	0
${}^{0^+}\tau^{\parallel}\dagger$	$-\frac{i}{2\sqrt{2}\,\alpha_1 k^3}$	$\frac{\beta_1+2\alpha_1 k^2}{4\alpha_1\beta_1 k^4}$	0	0
${}^{0^+}\tau^{\perp}\dagger$	0	0	0	0
${}^{0^-}\sigma^{\parallel}\dagger$	0	0	0	$\frac{1}{4\beta_1+2\alpha_1 k^2}$

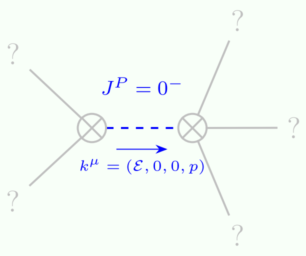
	${}^{1^+}\sigma^{\parallel}{}_{\alpha\beta}$	${}^{1^+}\sigma^{\perp}{}_{\alpha\beta}$	${}^{1^+}\tau^{\parallel}{}_{\alpha\beta}$	${}^{1^-}\sigma^{\parallel}{}_{\alpha}$	${}^{1^-}\sigma^{\perp}{}_{\alpha}$	${}^{1^-}\tau^{\parallel}{}_{\alpha}$	${}^{1^-}\tau^{\perp}{}_{\alpha}$
${}^{1^+}\sigma^{\parallel}\dagger^{\alpha\beta}$	$\frac{1}{2\beta_1+2\alpha_1 k^2}$	$-\frac{1}{2\sqrt{2}\,(1+k^2)(\beta_1+\alpha_1 k^2)}$	$-\frac{i k}{2\sqrt{2}\,(1+k^2)(\beta_1+\alpha_1 k^2)}$	0	0	0	0
${}^{1^+}\sigma^{\perp}\dagger^{\alpha\beta}$	$-\frac{1}{2\sqrt{2}\,(1+k^2)(\beta_1+\alpha_1 k^2)}$	$\frac{3\beta_1+2\alpha_1 k^2}{4\beta_1(1+k^2)^2(\beta_1+\alpha_1 k^2)}$	$\frac{i k(3\beta_1+2\alpha_1 k^2)}{4\beta_1(1+k^2)^2(\beta_1+\alpha_1 k^2)}$	0	0	0	0
${}^{1^+}\tau^{\parallel}\dagger^{\alpha\beta}$	$\frac{i k}{2\sqrt{2}\,(1+k^2)(\beta_1+\alpha_1 k^2)}$	$-\frac{i k(3\beta_1+2\alpha_1 k^2)}{4\beta_1(1+k^2)^2(\beta_1+\alpha_1 k^2)}$	$\frac{k^2(3\beta_1+2\alpha_1 k^2)}{4\beta_1(1+k^2)^2(\beta_1+\alpha_1 k^2)}$	0	0	0	0
${}^{1^-}\sigma^{\parallel}\dagger^{\alpha}$	0	0	0	$\frac{1}{\beta_1+2\alpha_1 k^2}$	0	0	0
${}^{1^-}\sigma^{\perp}\dagger^{\alpha}$	0	0	0	0	$\frac{1}{\beta_1(1+2k^2)^2}$	0	$\frac{i\sqrt{2}\,k}{\beta_1(1+2k^2)^2}$
${}^{1^-}\tau^{\parallel}\dagger^{\alpha}$	0	0	0	0	0	0	0
${}^{1^-}\tau^{\perp}\dagger^{\alpha}$	0	0	0	0	$-\frac{i\sqrt{2}\,k}{\beta_1(1+2k^2)^2}$	0	$\frac{2k^2}{\beta_1(1+2k^2)^2}$

	${}^{2^+}\sigma^{\parallel}{}_{\alpha\beta}$	${}^{2^+}\tau^{\parallel}{}_{\alpha\beta}$	${}^{2^-}\sigma^{\parallel}{}_{\alpha\beta\chi}$
${}^{2^+}\sigma^{\parallel}\dagger^{\alpha\beta}$	$\frac{1}{2\alpha_1 k^2}$	$\frac{i}{2\sqrt{2}\,\alpha_1 k^3}$	0
${}^{2^+}\tau^{\parallel}\dagger^{\alpha\beta}$	$-\frac{i}{2\sqrt{2}\,\alpha_1 k^3}$	$\frac{\beta_1+2\alpha_1 k^2}{4\alpha_1\beta_1 k^4}$	0
${}^{2^-}\sigma^{\parallel}\dagger^{\alpha\beta\chi}$	0	0	$\frac{1}{\beta_1+2\alpha_1 k^2}$

Source constraints

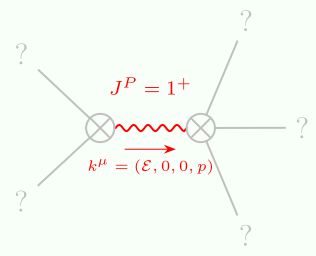
Spin-parity form	Covariant form	Multiplicities
${}^{0^+}\tau^{\perp} == 0$	$\partial_{\beta}\partial_{\alpha}\tau\,(\Delta+\mathcal{K})^{\alpha\beta} == 0$	1
${}^{1^-}\tau^{\parallel\,\alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau\,(\Delta+\mathcal{K})^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau\,(\Delta+\mathcal{K})^{\beta\alpha}$	3
$2\,i\,k\ {}^{1^-}\sigma^{\perp\,\alpha} + {}^{1^-}\tau^{\perp\,\alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau\,(\Delta+\mathcal{K})^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau\,(\Delta+\mathcal{K})^{\alpha\beta} + 2\,\partial_{\delta}\partial^{\delta}\partial_{\chi}\partial_{\beta}\sigma^{\beta\alpha\chi}$	3
$i\,k\ {}^{1^+}\sigma^{\perp\,\alpha\beta} + {}^{1^+}\tau^{\parallel\,\alpha\beta} == 0$	$\partial_{\chi}\partial^{\alpha}\tau\,(\Delta+\mathcal{K})^{\beta\chi} + \partial_{\chi}\partial^{\beta}\tau\,(\Delta+\mathcal{K})^{\chi\alpha} + \partial_{\chi}\partial^{\chi}\tau\,(\Delta+\mathcal{K})^{\alpha\beta} + 2\,\partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\chi\beta\delta} + 2\,\partial_{\delta}\partial^{\delta}\partial_{\chi}\sigma^{\chi\alpha\beta} == \partial_{\chi}\partial^{\alpha}\tau\,(\Delta+\mathcal{K})^{\chi\beta} + \partial_{\chi}\partial^{\beta}\tau\,(\Delta+\mathcal{K})^{\alpha\chi} + \partial_{\chi}\partial^{\chi}\tau\,(\Delta+\mathcal{K})^{\beta\alpha} + 2\,\partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\chi\alpha\delta}$	3
Total expected gauge generators:		10

Massive spectrum



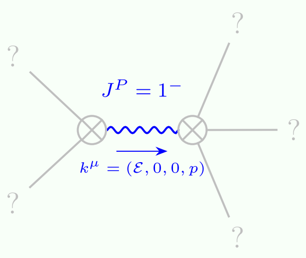
Massive particle

Pole residue:	$-\frac{1}{2\alpha_1} > 0$
Square mass:	$-\frac{2\beta_1}{\alpha_1} > 0$
Spin:	0
Parity:	Odd



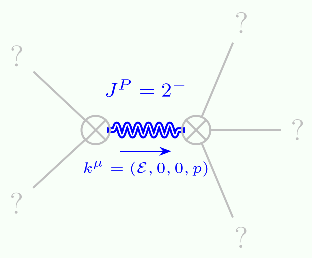
Massive particle

Pole residue:	$\frac{3\alpha_1-2\beta_1}{4\alpha_1^2-4\alpha_1\beta_1} > 0$
Square mass:	$-\frac{\beta_1}{\alpha_1} > 0$
Spin:	1
Parity:	Even



Massive particle

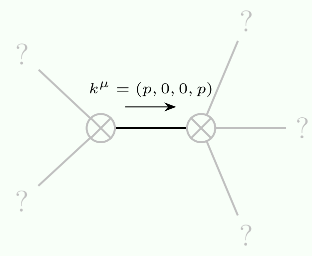
Pole residue:	$-\frac{1}{2\alpha_1} > 0$
Square mass:	$-\frac{\beta_1}{2\alpha_1} > 0$
Spin:	1
Parity:	Odd



Massive particle

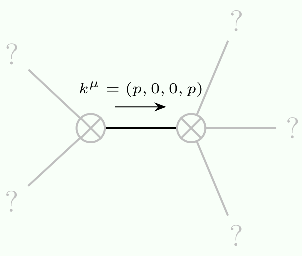
Pole residue:	$-\frac{1}{2\alpha_1} > 0$
Square mass:	$-\frac{\beta_1}{2\alpha_1} > 0$
Spin:	2
Parity:	Odd

Massless spectrum



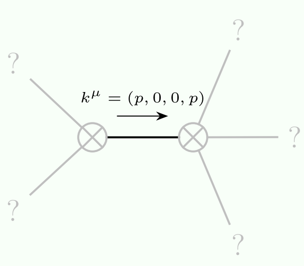
Massless particle

Pole residue:	$\frac{7}{\alpha_1} + \frac{2p^2}{\beta_1} + \frac{4\alpha_1 p^4}{\beta_1^2} > 0$
Polarisations:	2



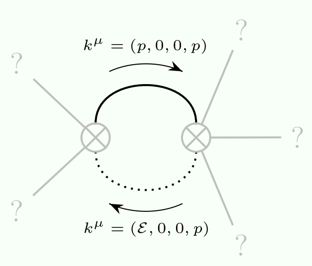
Massless particle

Pole residue:	$-\frac{1}{\alpha_1\beta_1^2}(\beta_1^2 + 28\,\alpha_1\beta_1 p^2 + 3\sqrt{(\beta_1^2(9\beta_1^2 - 8\,\alpha_1\beta_1 p^2 + 144\,\alpha_1^2 p^4))}) > 0$
Polarisations:	3



Massless particle

Pole residue:	$\frac{1}{\alpha_1\beta_1^2}(-\beta_1(\beta_1 + 28\,\alpha_1 p^2) + 3\sqrt{(\beta_1^2(9\beta_1^2 - 8\,\alpha_1\beta_1 p^2 + 144\,\alpha_1^2 p^4))}) > 0$
Polarisations:	3



Quartic pole

Pole residue:	$0 < \frac{p^2}{\alpha_1}\ \&\&\ \frac{p^2}{\alpha_1} > 0$
Polarisations:	3

Unitarity conditions

(Demonstrably impossible)