PSALTer results panel

$$\mathcal{S} == \iiiint\Big(-\tfrac{1}{2}\left(\alpha_0 - 4\beta_1\right)\mathcal{A}^{\alpha\beta}{}_{\alpha}\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi} + \mathcal{A}^{\alpha\beta\chi}\,\sigma_{\alpha\beta\chi} + f^{\alpha\beta}\,\tau(\Delta+\mathcal{K})_{\alpha\beta} - \alpha_0\,f^{\alpha\beta}\,\partial_{\beta}\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi} + \alpha_0\,\partial_{\beta}\mathcal{A}^{\alpha\beta}{}_{\alpha} - 4\beta_1\,\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi}\,\partial_{\beta}f^{\alpha\beta} + 4\beta_1\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi}\,\partial^{\beta}f^{\alpha}{}_{\alpha} - 2\beta_1\,\partial_{\beta}f^{\chi}{}_{\chi}\,\partial^{\beta}f^{\alpha}{}_{\alpha} + \alpha_0\,f^{\alpha\beta}\,\partial_{\chi}\mathcal{A}_{\alpha}{}^{\chi}{}_{\beta} - \alpha_0\,f^{\alpha}{}_{\alpha}\,\partial_{\chi}\mathcal{A}^{\beta\chi}{}_{\beta} - 2\beta_1\,\partial_{\beta}f^{\alpha\beta}\,\partial_{\chi}f_{\alpha}{}^{\chi} + 4\beta_1\,\partial^{\beta}f^{\alpha}{}_{\alpha}\,\partial_{\chi}f_{\beta}{}^{\chi} - 2\beta_1\,\partial_{\alpha}f_{\beta\chi}\,\partial^{\chi}f^{\alpha\beta} - \beta_1\,\partial_{\alpha}f_{\chi\beta}\,\partial^{\chi}f^{\alpha\beta} + \beta_1\,\partial_{\beta}f_{\alpha\chi}\,\partial^{\chi}f^{\alpha\beta} + \beta_1\,\partial_{\chi}f_{\alpha\beta}\,\partial^{\chi}f^{\alpha\beta} + \beta_1\,\partial_{\chi}f_{\beta\alpha}\,\partial^{\chi}f^{\alpha\beta} - \tfrac{1}{2}\,\mathcal{A}_{\alpha\chi\beta}\left(\left(\alpha_0 - 4\beta_1\right)\mathcal{A}^{\alpha\beta\chi} - 8\beta_1\,\partial^{\chi}f^{\alpha\beta}\right) + \tfrac{2}{3}\,\alpha_6\,\partial_{\beta}\mathcal{A}^{\alpha\beta}{}_{\alpha}\,\partial_{\delta}\mathcal{A}^{\chi\delta}{}_{\chi}\Big)[t,x,y,z]\,dz\,dy\,dx\,dt$$

Wave operator

$$\begin{array}{c|cccc}
 & {}^{0^+}\mathcal{A}^{\parallel} & {}^{0^+}f^{\parallel} & {}^{0^+}f^{\perp} & {}^{0^-}\mathcal{A}^{\parallel} \\ \hline
{}^{0^+}\mathcal{A}^{\parallel}\dagger & \frac{\alpha_0}{2} - 2\beta_1 + \alpha_6 k^2 & -\frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}} & 0 & 0 \\
{}^{0^+}f^{\parallel}\dagger & \frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}} & -4\beta_1 k^2 & 0 & 0 \\
{}^{0^+}f^{\perp}\dagger & 0 & 0 & 0 & 0 \\
{}^{0^-}\mathcal{A}^{\parallel}\dagger & 0 & 0 & 0 & \frac{1}{2}\left(\alpha_0 - 4\beta_1\right)
\end{array}$$

$$\begin{array}{c|ccccccc}
 & {}^{1^+}\mathcal{A}^{\parallel}{}_{\alpha\beta} & {}^{1^+}\mathcal{A}^{\perp}{}_{\alpha\beta} & {}^{1^+}f^{\parallel}{}_{\alpha\beta} & {}^{1^-}\mathcal{A}^{\parallel}{}_{\alpha} & {}^{1^-}\mathcal{A}^{\perp}{}_{\alpha} & {}^{1^-}f^{\parallel}{}_{\alpha} & {}^{1^-}f^{\perp}{}_{\alpha} \\ \hline
{}^{1^+}\mathcal{A}^{\parallel}\dagger^{\alpha\beta} & \frac{1}{4}\left(\alpha_0 - 4\beta_1\right) & \frac{\alpha_0-4\beta_1}{2\sqrt{2}} & \frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}} & 0 & 0 & 0 & 0 \\
{}^{1^+}\mathcal{A}^{\perp}\dagger^{\alpha\beta} & \frac{\alpha_0-4\beta_1}{2\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 \\
{}^{1^+}f^{\parallel}\dagger^{\alpha\beta} & -\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 \\
{}^{1^-}\mathcal{A}^{\parallel}\dagger^{\alpha} & 0 & 0 & 0 & \frac{1}{4}\left(\alpha_0 - 4\beta_1\right) & -\frac{\alpha_0-4\beta_1}{2\sqrt{2}} & 0 & -\frac{1}{2}i\left(\alpha_0 - 4\beta_1\right)k \\
{}^{1^-}\mathcal{A}^{\perp}\dagger^{\alpha} & 0 & 0 & 0 & -\frac{\alpha_0-4\beta_1}{2\sqrt{2}} & 0 & 0 & 0 \\
{}^{1^-}f^{\parallel}\dagger^{\alpha} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
{}^{1^-}f^{\perp}\dagger^{\alpha} & 0 & 0 & 0 & \frac{1}{2}i\left(\alpha_0 - 4\beta_1\right)k & 0 & 0 & 0
\end{array}$$

$$\begin{array}{c|ccc}
 & {}^{2^+}\mathcal{A}^{\parallel}{}_{\alpha\beta} & {}^{2^+}f^{\parallel}{}_{\alpha\beta} & {}^{2^-}\mathcal{A}^{\parallel}{}_{\alpha\beta\chi} \\ \hline
{}^{2^+}\mathcal{A}^{\parallel}\dagger^{\alpha\beta} & -\frac{\alpha_0}{4} + \beta_1 & \frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}} & 0 \\
{}^{2^+}f^{\parallel}\dagger^{\alpha\beta} & -\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}} & 2\beta_1 k^2 & 0 \\
{}^{2^-}\mathcal{A}^{\parallel}\dagger^{\alpha\beta\chi} & 0 & 0 & -\frac{\alpha_0}{4} + \beta_1
\end{array}$$

Saturated propagator

$$\begin{array}{c|cccc}
 & {}^{0^+}\sigma^{\parallel} & {}^{0^+}\tau^{\parallel} & {}^{0^+}\tau^{\perp} & {}^{0^-}\sigma^{\parallel} \\ \hline
{}^{0^+}\sigma^{\parallel}\dagger & \frac{8\beta_1}{\alpha_0^2 - 4\alpha_0\beta_1 + 8\alpha_6\beta_1 k^2} & -\frac{i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k + 8\alpha_6\beta_1 k^3} & 0 & 0 \\
{}^{0^+}\tau^{\parallel}\dagger & \frac{i\sqrt{2}(\alpha_0-4\beta_1)}{\alpha_0(\alpha_0-4\beta_1)k + 8\alpha_6\beta_1 k^3} & -\frac{\alpha_0 - 4\beta_1 + 2\alpha_6 k^2}{k^2(\alpha_0^2 - 4\alpha_0\beta_1 + 8\alpha_6\beta_1 k^2)} & 0 & 0 \\
{}^{0^+}\tau^{\perp}\dagger & 0 & 0 & 0 & 0 \\
{}^{0^-}\sigma^{\parallel}\dagger & 0 & 0 & 0 & \frac{2}{\alpha_0 - 4\beta_1}
\end{array}$$

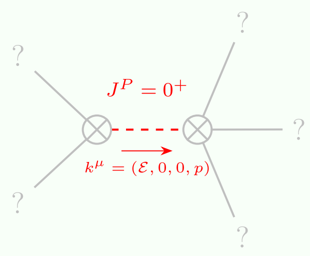
$$\begin{array}{c|ccccccc}
 & {}^{1^+}\sigma^{\parallel}{}_{\alpha\beta} & {}^{1^+}\sigma^{\perp}{}_{\alpha\beta} & {}^{1^+}\tau^{\parallel}{}_{\alpha\beta} & {}^{1^-}\sigma^{\parallel}{}_{\alpha} & {}^{1^-}\sigma^{\perp}{}_{\alpha} & {}^{1^-}\tau^{\parallel}{}_{\alpha} & {}^{1^-}\tau^{\perp}{}_{\alpha} \\ \hline
{}^{1^+}\sigma^{\parallel}\dagger^{\alpha\beta} & 0 & \frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)} & \frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)} & 0 & 0 & 0 & 0 \\
{}^{1^+}\sigma^{\perp}\dagger^{\alpha\beta} & \frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)} & -\frac{2}{(\alpha_0-4\beta_1)(1+k^2)^2} & -\frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2} & 0 & 0 & 0 & 0 \\
{}^{1^+}\tau^{\parallel}\dagger^{\alpha\beta} & -\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)} & \frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2} & -\frac{2k^2}{(\alpha_0-4\beta_1)(1+k^2)^2} & 0 & 0 & 0 & 0 \\
{}^{1^-}\sigma^{\parallel}\dagger^{\alpha} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)} & 0 & -\frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)} \\
{}^{1^-}\sigma^{\perp}\dagger^{\alpha} & 0 & 0 & 0 & -\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)} & -\frac{2}{(\alpha_0-4\beta_1)(1+2k^2)^2} & 0 & -\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2} \\
{}^{1^-}\tau^{\parallel}\dagger^{\alpha} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
{}^{1^-}\tau^{\perp}\dagger^{\alpha} & 0 & 0 & 0 & \frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)} & \frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2} & 0 & -\frac{4k^2}{(\alpha_0-4\beta_1)(1+2k^2)^2}
\end{array}$$

$$\begin{array}{c|ccc}
 & {}^{2^+}\sigma^{\parallel}{}_{\alpha\beta} & {}^{2^+}\tau^{\parallel}{}_{\alpha\beta} & {}^{2^-}\sigma^{\parallel}{}_{\alpha\beta\chi} \\ \hline
{}^{2^+}\sigma^{\parallel}\dagger^{\alpha\beta} & -\frac{16\beta_1}{\alpha_0^2 - 4\alpha_0\beta_1} & \frac{2i\sqrt{2}}{\alpha_0 k} & 0 \\
{}^{2^+}\tau^{\parallel}\dagger^{\alpha\beta} & -\frac{2i\sqrt{2}}{\alpha_0 k} & \frac{2}{\alpha_0 k^2} & 0 \\
{}^{2^-}\sigma^{\parallel}\dagger^{\alpha\beta\chi} & 0 & 0 & \frac{1}{-\frac{\alpha_0}{4} + \beta_1}
\end{array}$$

Source constraints

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

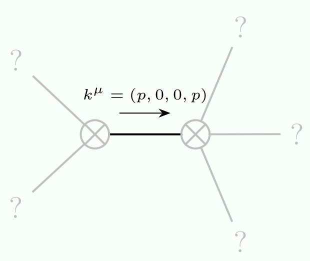
Massive spectrum



Massive particle

Pole residue:	$\frac{1}{\alpha_0} + \frac{1}{\alpha_6} - \frac{1}{4\beta_1} > 0$
Square mass:	$-\frac{\alpha_0(\alpha_0-4\beta_1)}{8\alpha_6\beta_1} > 0$
Spin:	0
Parity:	Even

Massless spectrum



Massless particle

Pole residue:	$\frac{p^2}{\alpha_0} > 0$
Polarisations:	2

Unitarity conditions

$\alpha_0 > 0\ \&\&\ \alpha_6 > 0\ \&\&\ \left(\beta_1 < 0\ \|\ \beta_1 > \frac{\alpha_0}{4}\right)$