

 $\frac{1}{\sqrt{2}\,\left(k^2+k^4\right)\left(2\,r_{\overset{.}{1}}+r_{\overset{.}{5}}\right)} \quad \frac{6\,k^2\left(2\,r_{\overset{.}{1}}+r_{\overset{.}{5}}\right)+t_{\overset{.}{1}}}{2\,\left(k+k^3\right)^2\left(2\,r_{\overset{.}{1}}+r_{\overset{.}{5}}\right)+t_{\overset{.}{1}}} \quad \frac{i\left(6\,k^2\left(2\,r_{\overset{.}{1}}+r_{\overset{.}{5}}\right)+t_{\overset{.}{1}}\right)}{2\,k\left(1+k^2\right)^2\left(2\,r_{\overset{.}{1}}+r_{\overset{.}{5}}\right)t_{\overset{.}{1}}}$

 $-\frac{i}{\sqrt{2}\,\left(k\!+\!k^3\right)\left(2\,r_{\dot{1}}\!+\!r_{\dot{5}}\right)}\,-\frac{i\left(6\,k^2\left(2\,r_{\dot{1}}\!+\!r_{\dot{5}}\right)\!+\!t_{\dot{1}}\right)}{2\,k\left(1\!+\!k^2\right)^2\left(2\,r_{\dot{1}}\!+\!r_{\dot{5}}\right)\!t_{\dot{1}}}\,\,\frac{6\,k^2\left(2\,r_{\dot{1}}\!+\!r_{\dot{5}}\right)\!+\!t_{\dot{1}}}{2\left(1\!+\!k^2\right)^2\left(2\,r_{\dot{1}}\!+\!r_{\dot{5}}\right)\!t_{\dot{1}}}$

 $\iiint \int \left(\frac{1}{3}\left(3\,t_{1}\,\mathcal{A}^{\alpha\,\prime}_{\alpha}\,\mathcal{A}^{\theta}_{\theta}+3\,\mathcal{A}^{\alpha\beta\chi}\,\,\sigma_{\alpha\beta\chi}+3\,\,f^{\alpha\beta}_{\alpha}\,\,\tau\,(\Delta+\mathcal{K})_{\alpha\beta}-6\,t_{1}\,\mathcal{A}^{\theta}_{\theta}\,\,\partial_{\prime}f^{\alpha\,\prime}_{}+6\,t_{1}\,\mathcal{A}^{\theta}_{\theta}\,\,\partial_{\prime}f^{\alpha}_{\alpha}-3\,t_{1}\,\partial_{\prime}f^{\theta}_{\theta}\,\partial^{\prime}f^{\alpha}_{\alpha}-3\,t_{1}\,\partial_{\prime}f^{\alpha\,\prime}_{\theta}+6\,t_{1}\,\partial^{\prime}_{\alpha}\partial_{\theta}f^{\theta}_{\alpha}-4\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\prime}_{\theta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\theta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}\,\partial^{\beta}\mathcal{A}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\alpha}+2\,r_{1}\,\partial_{\beta}\mathcal{A}_{\alpha\,\beta}^{\alpha\beta\,\prime}_{\phantom{\alpha$

 $\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} - 8\,r.\,\partial_{\beta}\mathcal{A}_{{}_{\prime}\,\theta\alpha}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} - 2\,r.\,\partial_{{}_{\prime}}\mathcal{A}_{\alpha\beta\theta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 2\,r.\,\partial_{\theta}\mathcal{A}_{\alpha\beta}{}^{\prime}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 2\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} - 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 2\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} - 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} - 3\,r.\,\partial_{\theta}\mathcal{A}_{\alpha{}_{\prime}\,\beta}\,\partial^{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}^{\alpha\beta}{}^{\prime} + 3\,r.\,\partial_{\theta}\mathcal{A}^{\alpha\beta}{}^{$

 $t. \mathcal{A}_{\alpha\theta} \left(\mathcal{A}^{\alpha i \theta} + 4 \partial^{\theta} f^{\alpha i} \right) - 3 r. \partial_{\alpha} \mathcal{A}^{\alpha i \theta} \partial_{\kappa} \mathcal{A}_{i \theta}^{\kappa} + 6 r. \partial^{\theta} \mathcal{A}^{\alpha i}_{\alpha} \partial_{\kappa} \mathcal{A}_{i \theta}^{\kappa} + 3 r. \partial_{\alpha} \mathcal{A}^{\alpha i \theta} \partial_{\kappa} \mathcal{A}_{\theta}^{\kappa} - 6 r. \partial^{\theta} \mathcal{A}^{\alpha i}_{\alpha} \partial_{\kappa} \mathcal{A}_{\theta}^{\kappa} \right) \left[t, x, y, z \right] dz dy dx dt$

 $2t. \mathcal{A}_{i,\theta\alpha} \partial^{\theta} f^{\alpha i} - 2t. \partial_{\alpha} f_{i,\theta} \partial^{\theta} f^{\alpha i} - 2t. \partial_{\alpha} f_{\theta i} \partial^{\theta} f^{\alpha i} + t. \partial_{i} f_{\alpha\theta} \partial^{\theta} f^{\alpha i} + 2t. \partial_{\theta} f_{\alpha i} \partial^{\theta} f^{\alpha i} + t. \partial_{\theta} f_{\alpha i} \partial^{\theta} f^{\alpha i} \partial^$

Source constraints

 $^{1} \cdot \sigma^{\parallel} \uparrow^{\alpha}$

 1 $^{-}$ σ^{\perp} \dagger^{α}

 $\mathbf{1}^{\scriptscriptstyle{-}}\boldsymbol{\tau}^{\parallel} \boldsymbol{\dagger}^{\alpha}$

 $\frac{1}{\cdot}\tau^{\perp} + \alpha$

 ${}^{0^{-}}\sigma^{\parallel}$ †

PSALTer results panel

<u>Wave operator</u>

Spin-parity form	Covariant form	Multiplicities
^{0−} σ == 0	$\epsilon \eta_{\alpha\beta\chi\delta} \ \delta^{\delta} \sigma^{\alpha\beta\chi} = 0$	1
${\stackrel{\Theta^+}{\scriptstyle{\bullet}}} \tau^{\perp} == \Theta$	$\partial_{\beta}\partial_{\alpha}\tau \left(\Delta+\mathcal{H}\right)^{\alpha\beta} = 0$	1
$-2 i k \cdot \sigma^{\parallel} + \tau^{\parallel} = 0$	$\partial_{\beta}\partial_{\alpha}\tau\left(\Delta+\mathcal{K}\right)^{\alpha\beta} == \partial_{\beta}\partial^{\beta}\tau\left(\Delta+\mathcal{K}\right)^{\alpha}_{\alpha} + 2 \partial_{\chi}\partial^{\chi}\partial_{\beta}\sigma^{\alpha}_{\alpha}^{\beta}$	1
$2 i k \frac{1}{\cdot} \sigma^{\perp}^{\alpha} + \frac{1}{\cdot} \tau^{\perp}^{\alpha} = 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}_{\tau}\left(\Delta+\mathcal{K}\right)^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta\tau}\left(\Delta+\mathcal{K}\right)^{\alpha\beta} + 2\partial_{\sigma}\partial^{\delta}\partial_{\chi}\partial_{\beta}\sigma^{\beta\alpha\chi}$	3
1 _τ α == 0	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}_{\tau}\left(\Delta+\mathcal{K}\right)^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta\tau}\left(\Delta+\mathcal{K}\right)^{\beta\alpha}$	3
$i k \frac{1}{\cdot} \sigma^{\perp}^{\alpha\beta} + \frac{1}{\cdot} \tau^{\parallel}^{\alpha\beta} = 0$	$\partial_{\chi}\partial^{\alpha}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\beta\chi} + \partial_{\chi}\partial^{\beta}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\chi\alpha} + \partial_{\chi}\partial^{\chi}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\chi\beta\delta} + 2 \partial_{\delta}\partial^{\delta}\partial_{\chi}\sigma^{\chi\alpha\beta} = \partial_{\chi}\partial^{\alpha}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\chi\beta} + \partial_{\chi}\partial^{\beta}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\alpha\chi} + \partial_{\chi}\partial^{\chi}{}_{\tau}\left(\Delta+\mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\chi\alpha\delta}$	3
$-2ik 2_{\bullet \sigma}^{+} \ ^{\alpha\beta} + 2_{\bullet \tau}^{+} \ ^{\alpha\beta} = 0$	$ = \frac{1}{2} \left[-i \left(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^{\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^{\alpha}_{\tau} (\Delta + \mathcal{K})^{\chi \beta} \right] $	5
	$3\ \partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\beta}{}_{\tau}\ (\Delta+\mathcal{K})^{\chi\alpha} + 3\ \partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\chi}{}_{\tau}\ (\Delta+\mathcal{K})^{\alpha\beta} + 3\ \partial_{\delta}\partial^{\delta}\partial_{\chi}\partial^{\chi}{}_{\tau}\ (\Delta+\mathcal{K})^{\beta\alpha} + 4\ i\ k^{\chi}\ \partial_{\epsilon}\partial_{\chi}\partial^{\beta}\partial^{\alpha}\sigma^{\delta}_{\ \delta} - 6\ i\ k^{\chi}\ \partial_{\epsilon}\partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\delta\beta\epsilon} - 6\ i\ k^{\chi}\ \partial_{\epsilon}\partial_{\delta}\partial_{\chi}\partial^{\beta}\sigma^{\delta\alpha\epsilon} +$	
	$ 6 \ \emph{i} \ \emph{k}^{\chi} \ \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial_{\chi} \sigma^{\alpha\beta\delta} + 6 \ \emph{i} \ \emph{k}^{\chi} \ \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial_{\chi} \sigma^{\beta\alpha\delta} + 2 \ \eta^{\alpha\beta} \ \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial_{\chi} \tau \ (\Delta + \mathcal{K})^{\chi\delta} - 2 \ \eta^{\alpha\beta} \ \partial_{\epsilon} \partial^{\epsilon} \partial_{\delta} \partial^{\delta} \tau \ (\Delta + \mathcal{K})^{\chi} - 4 \ \emph{i} \ \eta^{\alpha\beta} \ \emph{k}^{\chi} \ \partial_{\phi} \partial^{\phi} \partial_{\epsilon} \partial_{\chi} \sigma^{\delta}_{\ \delta} = 0 $	
Total expected gauge generators:		17

 $\frac{\sqrt{2}}{t_1+2k^2t_1}$

 $\frac{2ik}{2ik} \frac{i\sqrt{2}k(2k^2(r_1+r_5)-t_1)}{2ik} = 0$

 $\left(t_{i}+2 k^{2} t_{i}\right)^{2}$

 $t_1 + 2 k^2 t_1$

 $t_1 + 2 k^2 t$.

 $\frac{-4 k^4 (r_1 + r_2)}{15} + 2 k^2 t_1$

 $(t_{i}+2 k^{2} t_{i})^{2}$

 $^{2^{-}}\sigma^{\parallel}\uparrow^{lphaeta\chi}$

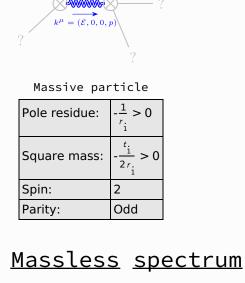
 $^{2^{-}}\sigma^{\parallel}_{\alpha\beta\chi}$

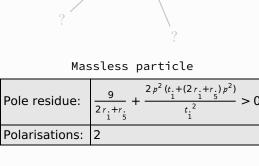
0

0

 $\frac{1}{2 k^2} r_1 + t_1$

<u>Massive</u> <u>spectrum</u>





 $k^{\mu} = (p, 0, 0, p)$

<u>Gauge</u> <u>symmetries</u>

<u>Unitarity</u> <u>conditions</u>

r. < 0 && r. > -2 r. && t. > 0

(Not yet implemented in PSALTer)

(Not yet implemented in PSALTer)

<u>Validity</u> <u>assumptions</u>