PSALTer results panel

Wave operator and propagator

Spin-parity form	Covariant form	Multiplicities
$0^+ \mathcal{T}^{\perp} == 0$	$\partial_\beta \partial_\alpha \mathcal{T}^{\alpha\beta} == 0$	1
$1^- \mathcal{T}^{\perp\alpha} == 0$	$\partial_\chi \partial_\beta \partial^\alpha \mathcal{T}^{\beta\chi} == \partial_\chi \partial^\chi \partial_\beta \mathcal{T}^{\alpha\beta}$	3
Total expected gauge generators:		4

	$3^- \mathcal{W}_s^{\parallel}{}_{\alpha\beta\chi}$
$3^- \mathcal{W}_s^{\parallel} \dagger^{\alpha\beta\chi}$	$-\frac{2}{a_0}$

	$3^- \mathcal{A}_s^{\parallel}{}_{\alpha\beta\chi}$
$3^- \mathcal{A}_s^{\parallel} \dagger^{\alpha\beta\chi}$	$-\frac{a_0}{2}$

$$
\begin{aligned}
S == \iiiint \Big(\tfrac{1}{8}\big(&-4 a_0 \mathcal{A}_{\alpha\chi\beta} \mathcal{A}^{\alpha\beta\chi} + 8 \mathcal{A}^{\alpha\beta\chi} \mathcal{W}_{\alpha\beta\chi} + 8 \mathcal{T}^{\alpha\beta} h_{\alpha\beta} + 4 a_0 h^{\alpha\beta} \partial_\beta \mathcal{A}_{\alpha}{}^{\chi}{}_{\chi} - 4 a_0 \mathcal{A}^{\alpha\beta\chi} \partial_\beta h_{\alpha\chi} + 2 a_0 \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\beta h^{\chi}{}_{\chi} + 2 a_0 h^{\alpha\beta} \partial_\beta \partial_\alpha h^{\chi}{}_{\chi} - a_0 \partial_\beta h^{\chi}{}_{\chi} \partial^\beta h^{\alpha}{}_{\alpha} - 4 a_0 h^{\alpha\beta} \partial_\chi \mathcal{A}_{\alpha}{}^{\chi}{}_{\beta} - \\
&2 a_0 h^{\alpha}{}_{\alpha} \partial_\chi \mathcal{A}^{\beta}{}_{\beta}{}^{\chi} + 2 a_0 h^{\alpha}{}_{\alpha} \partial_\chi \mathcal{A}^{\beta\chi}{}_{\beta} + 2 a_0 \partial^\beta h^{\alpha}{}_{\alpha} \partial_\chi h_\beta{}^{\chi} + 2 a_0 \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} (2 \mathcal{A}^{\chi}{}_{\beta\chi} - \partial_\beta h^{\chi}{}_{\chi} + 2 \partial_\chi h_\beta{}^{\chi}) - 2 h_{11} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\alpha h^{\delta}{}_{\delta} - 2 h_{12} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\alpha h^{\delta}{}_{\delta} + \\
&4 h_7 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\alpha h^{\delta}{}_{\delta} + 4 h_8 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\alpha h^{\delta}{}_{\delta} - 4 a_0 h^{\alpha\beta} \partial_\chi \partial_\beta h_\alpha{}^{\chi} + 2 a_0 h^{\alpha}{}_{\alpha} \partial_\chi \partial_\beta h^{\beta\chi} - 4 h_{10} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} + 2 h_{11} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} + 2 h_{12} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} - \\
&4 h_9 \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} + 2 a_0 h^{\alpha\beta} \partial^\chi \partial_\chi h_{\alpha\beta} - 2 a_0 h^{\alpha}{}_{\alpha} \partial_\chi \partial^\chi h^{\beta}{}_{\beta} - 4 h_8 \partial_\beta \mathcal{A}^{\chi}{}_{\delta}{}^{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_{12} \partial_\beta \mathcal{A}^{\delta}{}_{\chi\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_7 \partial_\chi \mathcal{A}_{\beta}{}^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_{11} \partial_\chi \mathcal{A}^{\delta}{}_{\beta\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} + \\
&2 h_{11} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} + 2 h_{12} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_7 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_8 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} - 4 h_{10} \partial_\beta \mathcal{A}^{\delta}{}_{\chi\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} - 4 h_9 \partial_\chi \mathcal{A}^{\delta}{}_{\beta\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} + 4 h_{10} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} - \\
&2 h_{11} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} - 2 h_{12} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} + 4 h_9 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} - 2 a_0 \partial_\beta h_{\alpha\chi} \partial^\chi h^{\alpha\beta} + a_0 \partial_\chi h_{\alpha\beta} \partial^\chi h^{\alpha\beta} + 2 h_{10} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial_\alpha h^{\alpha\beta} + 2 h_9 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial_\alpha h^{\alpha\beta} - \\
&h_{10} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} + h_{11} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} + h_{12} \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} - h_7 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} - h_8 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} - h_9 \partial_\chi \partial_\beta h^{\delta}{}_{\delta} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} - 4 h_7 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\alpha}{}^{\delta}{}_{\chi} - \\
&4 h_8 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\alpha\chi}{}^{\delta} - 4 h_{10} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\beta\chi}{}^{\delta} + 4 h_{12} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\beta\chi}{}^{\delta} + 8 h_{10} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \mathcal{A}_{\beta\chi}{}^{\delta} - 4 h_{11} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} - 4 h_{12} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} + \\
&8 h_7 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} + 8 h_8 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} + 4 h_{11} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} + 4 h_{12} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\beta}{}^{\delta}{}_{\chi} - 4 h_9 \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \mathcal{A}_{\chi\beta}{}^{\delta} + 4 h_{11} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \mathcal{A}_{\chi\beta}{}^{\delta} + \\
&8 h_9 \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \mathcal{A}_{\chi\beta}{}^{\delta} - 2 h_{11} \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\alpha{}^{\delta} - 2 h_{12} \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\alpha{}^{\delta} + 2 h_7 \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\alpha{}^{\delta} + 2 h_8 \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\alpha{}^{\delta} + 4 h_{10} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\beta h_\chi{}^{\delta} - \\
&2 h_{11} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_{12} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 4 h_9 \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_{10} \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_7 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_8 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_9 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - \\
&2 h_{11} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_{12} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 4 h_7 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 4 h_8 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 4 h_{10} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_{11} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + \\
&2 h_{12} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 4 h_9 \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_{11} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_{12} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 4 h_9 \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\beta h_\chi{}^{\delta} - 2 h_{11} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} - \\
&2 h_{12} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_7 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_8 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 2 h_9 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\beta h_\chi{}^{\delta} + 4 h_{11} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\alpha{}^{\delta} + 4 h_{12} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\alpha{}^{\delta} - \\
&8 h_7 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\alpha{}^{\delta} - 8 h_8 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\alpha{}^{\delta} + 4 h_{10} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{11} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{12} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 4 h_9 \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial_\chi h_\beta{}^{\delta} + \\
&2 h_{10} \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_7 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_8 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_9 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{11} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{12} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} + \\
&4 h_7 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 4 h_8 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 4 h_{10} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_{11} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_{12} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 4 h_9 \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} - \\
&4 h_{10} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_{11} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_{12} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_{10} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{11} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} - 2 h_{12} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} + \\
&2 h_7 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} + 2 h_8 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial_\chi h_\beta{}^{\delta} - h_{10} \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} + h_{11} \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} + h_{12} \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} - h_7 \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} - h_8 \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} - \\
&h_9 \partial_\chi \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\alpha\beta} - 2 h_{11} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\alpha\chi} - 2 h_{12} \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\alpha\chi} + 4 h_7 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\alpha\chi} + 4 h_8 \partial_\beta \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\alpha\chi} - 4 h_{10} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\beta\chi} + \\
&2 h_{11} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\beta\chi} + 2 h_{12} \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\beta\chi} - 4 h_9 \partial_\alpha \mathcal{A}^{\alpha\beta\chi} \partial_\delta \partial^\delta h_{\beta\chi} + 2 h_7 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} + 2 h_8 \partial_\alpha \partial^\chi h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} + 2 h_{11} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial^\delta h_{\beta\chi} + \\
&2 h_{12} \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial^\delta h_{\beta\chi} - 4 h_7 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial^\delta h_{\beta\chi} - 4 h_8 \partial^\chi \mathcal{A}^{\alpha}{}_{\alpha}{}^{\beta} \partial_\delta \partial^\delta h_{\beta\chi} + 4 h_{10} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_{11} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_{12} \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} + \\
&4 h_9 \partial^\chi \mathcal{A}^{\alpha\beta}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} + 4 h_{10} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_{11} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_{12} \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} + 4 h_9 \partial^\chi \partial_\alpha h^{\alpha\beta} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_{10} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} + \\
&2 h_{11} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} + 2 h_{12} \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_7 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_8 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi} - 2 h_9 \partial^\chi \partial^\beta h^{\alpha}{}_{\alpha} \partial_\delta \partial^\delta h_{\beta\chi}\big)\Big)[t, x, y, z]\, dz\, dy\, dx\, dt
\end{aligned}
$$

	$2^+ \mathcal{T}^{\parallel}{}_{\alpha\beta}$	$2^+ \mathcal{W}_s^{\parallel}{}_{\alpha\beta}$	$2^+ \mathcal{W}_s^{\perp}{}_{\alpha\beta}$	$2^- \mathcal{W}_s^{\parallel}{}_{\alpha\beta\chi}$
$2^+ \mathcal{T}^{\parallel} \dagger^{\alpha\beta}$	$\frac{-2 k^4 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))+8 k^2 (-h_{11}-h_{12}+h_7+h_8) a_0-8 a_0^2}{k^2 a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$-\frac{i k(k^2 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))+4(h_{10}-h_7-h_8+h_9) a_0)}{\sqrt{3} a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$\frac{2 i \sqrt{\frac{2}{3}} k (k^2 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-(2 h_{10}-3 h_{11}-3 h_{12}+4(h_7+h_8)+2 h_9) a_0)}{a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	0
$2^+ \mathcal{W}_s^{\parallel} \dagger^{\alpha\beta}$	$\frac{i (k^3 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))+4 k (h_{10}-h_7-h_8+h_9) a_0)}{\sqrt{3} a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$-\frac{k^4 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-4 k^2 (-2 h_{10}+h_{11}+h_{12}+h_7+h_8-2 h_9) a_0+12 a_0^2}{6 a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$\frac{\sqrt{2} k^2 (k^2 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-(-2 h_{10}+h_{11}+h_{12}+4(h_7+h_8)-2 h_9) a_0)}{3 a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	0
$2^+ \mathcal{W}_s^{\perp} \dagger^{\alpha\beta}$	$-\frac{2 i \sqrt{\frac{2}{3}} (k^3 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-k (2 h_{10}-3 h_{11}-3 h_{12}+4(h_7+h_8)+2 h_9) a_0)}{a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$\frac{\sqrt{2} k^2 (k^2 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-(-2 h_{10}+h_{11}+h_{12}+4(h_7+h_8)-2 h_9) a_0)}{3 a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	$\frac{-4 k^4 ((h_{11}+h_{12})^2-4(h_7+h_8)(h_{10}+h_9))-8 k^2 (-2 h_{10}+h_{11}+h_{12}-2(h_7+h_8+h_9)) a_0+12 a_0^2}{3 a_0^2 (k^2 (h_{10}+h_9)+a_0)}$	0
$2^- \mathcal{W}_s^{\parallel} \dagger^{\alpha\beta\chi}$	0	0	0	$\frac{4}{a_0}$

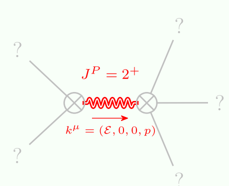
	$1^+ \mathcal{A}_s^{\perp}{}_{\alpha\beta}$	$1^- h^{\perp}{}_{\alpha}$	$1^- \mathcal{A}_s^{\perp t}{}_{\alpha}$	$1^- \mathcal{A}_s^{\parallel t}{}_{\alpha}$	$1^- \mathcal{A}_s^{\perp h}{}_{\alpha}$	$1^- \mathcal{A}_s^{\parallel h}{}_{\alpha}$
$1^+ \mathcal{A}_s^{\perp} \dagger^{\alpha\beta}$	$\frac{1}{4} (k^2 (h_{10}-h_9)+ a_0)$	0	0	0	0	0
$1^- h^{\perp} \dagger^{\alpha}$	0 0		0	0	0	0
$1^- \mathcal{A}_s^{\perp t} \dagger^{\alpha}$	0	0	$\frac{1}{6} (-k^2 (h_{11}+h_7+h_9)-2 a_0)$	$\frac{1}{6} \sqrt{5} (k^2 (h_{10}+h_{12}+h_8)+ a_0)$	$\frac{2 k^2 (h_{11}+h_7+h_9)+a_0}{12 \sqrt{2}}$	$\frac{1}{12} (k^2 (4 h_{10}+h_{12}-2 h_8)+ a_0)$
$1^- \mathcal{A}_s^{\parallel t} \dagger^{\alpha}$	0	0	$\frac{1}{6} \sqrt{5} (k^2 (h_{10}+h_{12}+h_8)+ a_0)$	$\frac{1}{6} (-5 k^2 (h_{11}+h_7+h_9)+2 a_0)$	$\frac{1}{12} \sqrt{\frac{5}{2}} (-2 k^2 (h_{10}+h_{12}+h_8)+ a_0)$	$\frac{1}{12} \sqrt{5} (-k^2 (h_{11}-2 h_7+4 h_9)+ a_0)$
$1^- \mathcal{A}_s^{\perp h} \dagger^{\alpha}$	0	0	$\frac{2 k^2 (h_{11}+h_7+h_9)+a_0}{12 \sqrt{2}}$	$\frac{1}{12} \sqrt{\frac{5}{2}} (-2 k^2 (h_{10}+h_{12}+h_8)+ a_0)$	$\frac{1}{12} (-k^2 (h_{11}+h_7+h_9)+ a_0)$	$\frac{-k^2 (4 h_{10}+h_{12}-2 h_8)-4 a_0}{12 \sqrt{2}}$
$1^- \mathcal{A}_s^{\parallel h} \dagger^{\alpha}$	0	0	$\frac{1}{12} (k^2 (4 h_{10}+h_{12}-2 h_8)+ a_0)$	$\frac{1}{12} \sqrt{5} (-k^2 (h_{11}-2 h_7+4 h_9)+ a_0)$	$\frac{-k^2 (4 h_{10}+h_{12}-2 h_8)-4 a_0}{12 \sqrt{2}}$	$\frac{1}{12} (k^2 (4 h_{11}-2(h_7+4 h_9))- a_0)$

	$0^+ \mathcal{T}^{\perp}$	$0^+ \mathcal{T}^{\parallel}$	$0^+ \mathcal{W}_s^{\perp t}$	$0^+ \mathcal{W}_s^{\parallel}$	$0^+ \mathcal{W}_s^{\perp h}$
$0^+ \mathcal{T}^{\perp} \dagger$	0	0	0	0	0
$0^+ \mathcal{T}^{\parallel} \dagger$	0	$\frac{4(2 k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+a_0)}{k^2 a_0^2}$	$\frac{4 i k(2 h_{10}-h_{11}-h_{12}+2 h_9)}{\sqrt{3} a_0^2}$	$\frac{4 i k(h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)}{\sqrt{3} a_0^2}$	$-\frac{8 i \sqrt{\frac{2}{3}} k (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)}{a_0^2}$
$0^+ \mathcal{W}_s^{\perp t} \dagger$	0	$-\frac{4 i k(2 h_{10}-h_{11}-h_{12}+2 h_9)}{\sqrt{3} a_0^2}$	$-\frac{2 k^2 (7 h_{10}+3(h_{11}+h_{12}+h_7+h_8)+7 h_9)+a_0}{3 a_0^2}$	$\frac{k^2 (4 h_{10}-2(h_{11}+h_{12}-2 h_9))+5 a_0}{3 a_0^2}$	$\frac{2 \sqrt{2}(2 k^2 (-2 h_{10}+h_{11}+h_{12}-2 h_9)+a_0)}{3 a_0^2}$
$0^+ \mathcal{W}_s^{\parallel} \dagger$	0	$\frac{4 i k(-h_{10}+h_{11}+h_{12}-h_7-h_8-h_9)}{\sqrt{3} a_0^2}$	$\frac{k^2 (4 h_{10}-2(h_{11}+h_{12}-2 h_9))+5 a_0}{3 a_0^2}$	$-\frac{-2 k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+a_0}{3 a_0^2}$	$\frac{2 \sqrt{2}(-2 k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+a_0)}{3 a_0^2}$
$0^+ \mathcal{W}_s^{\perp h} \dagger$	0	$-\frac{8 i \sqrt{\frac{2}{3}} k (-h_{10}+h_{11}+h_{12}-h_7-h_8-h_9)}{a_0^2}$	$\frac{2 \sqrt{2}(2 k^2 (-2 h_{10}+h_{11}+h_{12}-2 h_9)+a_0)}{3 a_0^2}$	$\frac{2 \sqrt{2}(-2 k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+a_0)}{3 a_0^2}$	$\frac{8(2 k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)-a_0)}{3 a_0^2}$

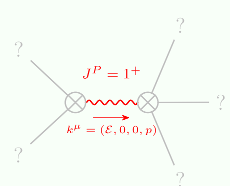
	$0^+ h^{\perp}$	$0^+ h^{\parallel}$	$0^+ \mathcal{A}_s^{\perp t}$	$0^+ \mathcal{A}_s^{\parallel}$	$0^+ \mathcal{A}_s^{\perp h}$
$0^+ h^{\perp} \dagger$	0	0	0	0	0
$0^+ h^{\parallel} \dagger$	0	$\frac{1}{4} (-2 k^4 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+ k^2 a_0)$	0	$-\frac{i k^3 (h_{10}-h_7-h_8+h_9)}{2 \sqrt{3}}$	$-\frac{i k^3 (7 h_{10}-6 h_{11}-6 h_{12}+5(h_7+h_8)+7 h_9)}{4 \sqrt{6}}$
$0^+ \mathcal{A}_s^{\perp t} \dagger$	0	0	0	$\frac{a_0}{2}$	$\frac{a_0}{4 \sqrt{2}}$
$0^+ \mathcal{A}_s^{\parallel} \dagger$	0	$\frac{i k^3 (h_{10}-h_7-h_8+h_9)}{2 \sqrt{3}}$	$\frac{a_0}{2}$	$-\frac{2}{3} k^2 (h_{10}+h_{11}+h_{12}+h_7+h_8+h_9)$	$\frac{-2 k^2 (5 h_{10}+2 h_{11}+2 h_{12}-h_7-h_8+5 h_9)+3 a_0}{12 \sqrt{2}}$
$0^+ \mathcal{A}_s^{\perp h} \dagger$	0	$\frac{i k^3 (7 h_{10}-6 h_{11}-6 h_{12}+5(h_7+h_8)+7 h_9)}{4 \sqrt{6}}$	$\frac{a_0}{4 \sqrt{2}}$	$\frac{-2 k^2 (5 h_{10}+2 h_{11}+2 h_{12}-h_7-h_8+5 h_9)+3 a_0}{12 \sqrt{2}}$	$\frac{1}{12} (-k^2 (13 h_{10}-8 h_{11}-8 h_{12}+7(h_7+h_8)+13 h_9)-3 a_0)$

	$2^+ h^{\parallel}{}_{\alpha\beta}$	$2^+ \mathcal{A}_s^{\parallel}{}_{\alpha\beta}$	$2^+ \mathcal{A}_s^{\perp}{}_{\alpha\beta}$	$2^- \mathcal{A}_s^{\parallel}{}_{\alpha\beta\chi}$
$2^+ h^{\parallel} \dagger^{\alpha\beta}$	$-\frac{1}{8} k^2 (k^2 (h_{10}-h_{11}-h_{12}+h_7+h_8+h_9)+ a_0)$	$\frac{i k^3 (h_{10}-h_7-h_8+h_9)}{4 \sqrt{3}}$	$-\frac{i k^3 (2 h_{10}-3 h_{11}-3 h_{12}+4(h_7+h_8)+2 h_9)}{8 \sqrt{6}}$	0
$2^+ \mathcal{A}_s^{\parallel} \dagger^{\alpha\beta}$	$-\frac{i k^3 (h_{10}-h_7-h_8+h_9)}{4 \sqrt{3}}$	$\frac{1}{6} (-k^2 (h_{10}+h_{11}+h_{12}+h_7+h_8+h_9)-3 a_0)$	$\frac{k^2 (2 h_{10}-h_{11}-h_{12}-4(h_7+h_8)+2 h_9)}{12 \sqrt{2}}$	0
$2^+ \mathcal{A}_s^{\perp} \dagger^{\alpha\beta}$	$\frac{i k^3 (2 h_{10}-3 h_{11}-3 h_{12}+4(h_7+h_8)+2 h_9)}{8 \sqrt{6}}$	$\frac{k^2 (2 h_{10}-h_{11}-h_{12}-4(h_7+h_8)+2 h_9)}{12 \sqrt{2}}$	$\frac{1}{12} (-k^2 (h_{10}-2 h_{11}-2 h_{12}+4(h_7+h_8)+ h_9)+3 a_0)$	0
$2^- \mathcal{A}_s^{\parallel} \dagger^{\alpha\beta\chi}$	0	0	0	$\frac{a_0}{4}$

Massive and massless spectra



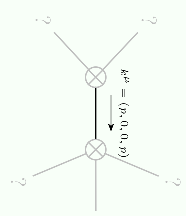
Massive particle



Massive particle

Massless particle

Pole residue:	$-\frac{1}{a_0} > 0$
Polarisations:	2



Poleresidue:	$\frac{1}{2(h_{10}+h_9)^3 a_0}(16 h_{10}^3 +4 h_{12}^2 h_9 -16 h_{12} h_9^2 +16 h_9^3 + h_{11}^2 (4 h_9 -3 a_0)- 3 h_{12}^2 a_0 +4 h_{12} h_9 a_0 -4 h_9^2 a_0 -4 h_{10}^2 (4 h_{11} +4 h_{12} -12 h_9 + a_0)+ 4 h_{10} (h_{11} + h_{12} -2 h_9)(h_{11} + h_{12} -6 h_9 + a_0)+2 h_{11} (4 h_{12} h_9 -8 h_9^2 -3 h_{12} a_0 +2 h_9 a_0)) > 0$
Square mass:	$-\frac{a_0}{h_{10}+h_9} > 0$
Spin:	2
Parity:	Even

Poleresidue:	$\frac{4}{h_{10}-h_9} > 0$
Square mass:	$-\frac{a_0}{h_{10}-h_9} > 0$
Spin:	1
Parity:	Even

Unitarity conditions

(Timeout after 20 seconds)