## **PSALTer results panel**

## Wave operator and propagator

	$^{1^+}\mathcal{F}_{S^{^{\perp}}lphaeta}$	$^1{\it h}^{\scriptscriptstyle \perp}{}_{\alpha}$	$^{1}\mathcal{A}_{s^{\perpt}}{}_{\alpha}$	${}^{1}\mathcal{A}_{S}{}^{It}{}_{lpha}$	<sup>1</sup> A <sub>s</sub>	h α	$^1\mathcal{A}_{S}{}^{lh}{}_{lpha}$		$^{0^+}\mathcal{T}^{\scriptscriptstyle \perp}$	o <u>.</u> +√∥	$^{0^+}\mathcal{W}_{S}^{\perpt}$	O	).+W <sub>s</sub>	0+0	Ws <sup>⊥h</sup>
$^{1.}\mathcal{H}_{S^{\perp}}+^{lphaeta}$	$\frac{a}{0}$	0	0	0	0		0	<sup>0,+</sup> ℋ+		0	0	0			0
$^{1}$ $h^{\perp}$ $\dagger^{\alpha}$	0	0	0	0	0		0	0. <sup>+</sup> √" †	0	$\frac{4(2 k^{2} (-2 h+h.+h.)+a.)}{\frac{12}{k^{2} a^{2}}}$	$-\frac{8 i k h.}{\sqrt{3} a.^{2}}$	4 i k	$\frac{(2hhh.)}{\sqrt{3}a.^2}$	$\frac{8i\sqrt{\frac{2}{3}}k($	(2 hhh .) 12 7 8
$^{1}\mathcal{A}_{S}{}^{\scriptscriptstyle\perpt}†^{^{lpha}}$	0	0	$\frac{1}{6} \left( -k^2 \left( h_{.12} + h_{.7} \right) - 2 a_{.0} \right)$	$\frac{1}{6} \sqrt{5} (k^2 (h_{.12} + h_{.1}) + a_{.0})$	$\frac{2 k^2 (h_1 + h_2) + a_2}{12 \sqrt{2}}$		$\frac{1}{12} (k^2 (h_{12} - 2 h_8) + a_0)$			8 i k h.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		<sup>2</sup> h +5 a .		$k^2 h_1 + a_2$
$^{1}\mathcal{A}_{S}^{It}+^{^{lpha}}$	0	0	$\frac{1}{6} \sqrt{5} \left( k^2 \left( h_{} + h_{.} \right) + a_{.} \right)$		$\frac{1}{12} \sqrt{\frac{5}{2}} \left( -2 k^2 (h_1 + h_1) + a_1 \right)$			O+~t.	0	$\sqrt{3} \ a_0^2$	3 a. 2		3 a . 2	3	a.² 0
$^{1}\mathcal{A}_{S}{}^{{\scriptscriptstyle\perp}h}\dagger^{^{lpha}}$	0	0		$\frac{1}{12} \sqrt{\frac{5}{2}} \left( -2 k^2 (h_1 + h_2) + a_1 \right)$			$-\frac{k^2 (h_{12} - 2 h_{8}) + 4 a_{12}}{12 \sqrt{2}}$	0.+Ws   t	0	$\frac{4 i k(2 hhh.)}{\sqrt{3} a{0}^{2}}$	$\frac{-4 k^2 h + 5 a}{3 a \cdot {}_{0}^{2}}$	$-\frac{k^2 (4 h)}{12}$	$\frac{(2 - 2(h_1 + h_1)) + a_1}{3 a_1^2}$	$\frac{2\sqrt{2}(k^2(4h))}{3}$	$\frac{a^{-2}(h.+h.))+a.)}{a.^{2}}$
$^{1}\mathcal{A}_{s}{}^{\parallelh}\dagger^{^{lpha}}$	0	0	$\frac{1}{12} (k^2 (h_1 - 2 h_1) + a_1)$	$\frac{1}{12} \sqrt{5} \left( -k^2 \left( h_1 - 2 h_1 \right) + a_1 \right)$	$-\frac{\kappa^2 (h_{12} - 2 h_{12})}{12}$		$\frac{12 \sqrt{2}}{\frac{1}{12} (k^2 (4 h_{} -2 h_{.}) - a_{.0}}{7}$	0.+Ws <sup>+h</sup> †	0	$-\frac{8 i \sqrt{\frac{2}{3}} k (2 h - h - h)}{a \cdot \binom{2}{3}}$	$\frac{2\sqrt{2}(4k^2h.+a.)}{3a0^2}$	$\frac{2\sqrt{2}(k^2)(4)}{k^2}$	$\frac{h2(h. +h.)) + a.)}{3a{0}^{2}}$	8(k² (4 h 12	$\frac{2(h_1+h_2)+a_0}{a_0^2}$
L	$^{1^+}\mathcal{W}_{S^\perp lpha eta}$	$_{ ho}$ $^{1}\mathcal{T}^{\scriptscriptstyle \perp}$		1-W <sub>s</sub> <sup>1t</sup> <sub>α</sub>	12 \	2	1-W <sub>s</sub>   t <sub>α</sub>			1-W <sub>s</sub> <sup>±h</sup> <sub>α</sub>	0		0	¹ W <sub>s</sub> ∥h <sub>α</sub>	0
$1^+W_{s}^{\perp} \uparrow^{\alpha\beta}$	4	0		0			0			0				0	
$^{1}\mathcal{T}^{\scriptscriptstyle{\perp}}$ † $^{^{lpha}}$	0	d		0			0		0				0		
$^{1}\mathcal{W}_{s^{\perpt}}t^{\alpha}$	0	0	20 k <sup>6</sup> h. <sup>2</sup> (hh.)-4 k <sup>4</sup> (h. <sup>2</sup> -h	$\frac{(2^{2} + h_{8}^{2} + 4h_{12}^{2} (-h_{7} + h_{8}))a_{0} + 8k^{2} (4h_{12} + h_{7}^{2})}{3a_{0}^{3} (k^{2} (h_{7} - h_{8}) + 3a_{0})}$	$\frac{1+2}{7}$ $\frac{1}{8}$ $\frac{1}{0}$ $\frac{1}{0}$ $\frac{1}{0}$ $\frac{3}{0}$	$\frac{\sqrt{5} (4 k^4 h_{12} (h_{12})^{-7})}{3 a}$	$\frac{2\sqrt{2}\left(10\frac{k^6h_{.12}^{-2}(h,-h_8)-2k^4(h_{.12}^{-2}-h_7^{-2}+h_8^{-2}+4h_{.1}^{-2}(-h_7+h_8))a_0^{-k}+k^2(4h_{.12}+7h_7+5h_8)a_0^{-2}+a_0^{-2}h_8^{-2}h_8^{-2}+4h_8^{-2}h_8^{-2}+4h_8^{-2}h_8^{-2}+4h_8^{-2}h_8^{-2}+h_8^{-2}+h_8$				$h_{8}^{1} a_{0}^{2} + a_{0}^{3}$	$\frac{\frac{3}{12} \left(\frac{3}{12} \left(\frac{1}{12} \right)\right)\right)\right)\right)\right)}{1}\right)\right)\right)}\right)}{1}\right)}\right)}} \right)} \right)} \right)} \right)} + \frac{1}{3} \left(\frac{1}{12} \right)\right)\right)\right)}{1}\right)\right)}\right)\right)}{1}\right)}\right)}\right)}\right)}\right)}}\right)}$			
$^{1}\mathcal{W}_{s}^{\parallelt}t^{lpha}$	0	0	$\sqrt{5}(4 k^4)$	$h_{12}(h_1-h_1)+2k^2(2h_1+h_1-h_1)a_1+5a_1^2$		4	$2\sqrt{10}(2k^2h_{12}+a_0)(k^2(h_7-h_8)+a_0)$					$4\sqrt{5}(k^2(h_7-h_8)+a_0)$			
· WS I		ļ ,	2 √2 (10 +6 h 2 (h = h 1-2 +4 (h	$3a_0^2(k^2(h_1-h_1)+3a_1)$	+7 h +5 h ) a <sup>2</sup> + a <sup>3</sup> )	3 a. 0	$3a_{0}^{2}(k^{2}(h_{7}^{2}-h_{8}^{2})+3a_{0}^{2})$				2+2a 3)	$3 a_{0} (k^{2} (h_{7} - h_{8}) + 3 a_{0})$			
$^{1}W_{s}^{\perp h}\dagger^{\alpha}$	0	0		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7 8 0 0	$2 \cdot (2 \cdot $			$\frac{8(5 k^6 h_{12}^2 (h_7 - h_8) - k^4 (h_{12}^2 - h_7^2 + h_8^2 + 4 h_{12} (-h_7^2 + h_8^2)) a_0 + k^2 (-4 h_{12} + 5 h_7^2 + h_8^2) a_0^2 + 2 a_0^3)}{3 a_0^3 (k^2 (h_7^2 - h_8^2) + 3 a_0^2)}$				$-\frac{4\sqrt{2}(5k^4h_{12}(-h_1^2+h_1^2)+k^2(h_1^2-h_1^2+h_1^2)a_0^2+5a_0^2)}{3a_0^2(k^2(h_1^2-h_1^2)+3a_0^2)}$		
$^{1}\mathcal{W}_{s}^{\parallel h}\dagger^{^{lpha}}$	0	0	4(5	$\frac{k^4 h_{.2} (h_7 - h_8) - k^2 (h_{.2} - h_7 + h_8) a_0 + a_0^2}{3 a_0^2 (k^2 (h_7 - h_8) + 3 a_0)}$		3 4	$\frac{4\sqrt{2}(5k^4h_{.2}(-h_7+h_8)+k^2(h_{.2}-h_7+h_8)a_0+5a_0^2)}{3a_0^2(k^2(h_7-h_8)+3a_0)}$					$\frac{4}{3} \left( \frac{5}{a_0} - \frac{16}{k^2 (h_{7} - h_{8}) + 3 a_0} \right)$			
							$^{2^{+}}_{\cdot \cdot \cdot h^{\parallel}_{\alpha\beta}}$	².⁺ <i>9</i>	7 <sub>5</sub> ∥ <sub>αβ</sub>	<sup>2+</sup> $\mathcal{H}_{s}^{-}$	$_{\alpha\beta}$ $^{2}\mathcal{A}_{s}^{\parallel}{}_{\alpha\beta\chi}$				
		ταβ α	θχθη <sup>α</sup> -		d t	$2^+h^{\parallel}+^{\alpha\beta}$ $\frac{1}{8}$ (k	$4(2hhh.)-k^2a.)$	$-\frac{i k^3}{4}$	h.+h.) √3	$\frac{i  k^3  (3  h_{12} - 2)}{4  \sqrt{6}}$	0				
		б дх <b>Я</b> ч	, o	$^{\circ}_{\alpha}$ $^{\circ}_{\alpha}$ $^{\circ}_{\alpha}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$ $^{\circ}_{\gamma}$ $^{\circ}_{\beta}$ $^{\circ}_{\gamma}$	× 7	$\mathcal{A}^{+}_{S}\mathcal{A}_{S}^{\parallel} + \alpha^{\alpha\beta}$		$(-k^2)(2h_1 + 12)$			h.+h.))				
+ × 4	, ,	808 X	$^{1}$ $^{3}$ $^{4}$ $^{6}$ $^{1}$ $^{3}$ $^{4}$ $^{5}$ $^{1}$ $^{3}$ $^{4}$ $^{5}$ $^{5}$ $^{5}$ $^{4}$ $^{5}$	$\begin{array}{c} 1h \cdot \partial^{\chi} \partial_{\alpha} h^{\alpha\beta} \partial_{\alpha} \partial_{\beta} h_{\chi} \\ 1_{12} \partial_{\beta} \mathcal{A}^{\alpha\beta\chi} \partial_{\beta} \partial_{\alpha} h_{\alpha}^{\delta} \\ 1_{17} \partial_{\beta} \mathcal{A}^{\alpha\beta\chi} \partial_{\beta} \partial_{\alpha} h_{\beta}^{\delta} + \\ \partial^{\chi} \mathcal{A}^{\alpha}_{\alpha} \partial_{\alpha} \partial_{\alpha} \partial_{\gamma} h_{\beta}^{\delta} + \\ 1_{12} \partial^{\chi} \partial^{\beta} h_{\alpha}^{\alpha} \partial_{\alpha} \partial_{\gamma} h_{\beta}^{\delta} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\beta} \partial_{\alpha} h_{\alpha} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\alpha} \partial_{\gamma} h_{\alpha} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\gamma} \partial_{\gamma} h^{\alpha\beta} \partial_{\gamma} h_{\alpha} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\gamma} h^{\alpha\beta} \partial_{\gamma} h_{\alpha} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\gamma} h^{\alpha\beta} \partial_{\gamma} h^{\alpha\beta} \partial_{\gamma} h_{\alpha} \\ \partial^{\chi} h^{\alpha\beta} \partial_{\gamma} $	$\int_{a}^{b} ds \partial^{\delta} h_{\beta X}$		$ \frac{4 \sqrt{3}}{\frac{i k^3 (3 h_1 - 2(h_1 + h_1))}{4 \sqrt{6}}} $								
$\begin{pmatrix} x + x \\ x + x \end{pmatrix}$	$\partial_{eta} \mathcal{A}^{lphaeta\chi}  \partial_{\chi} \partial_{lpha} h^{\delta}$	7	$h_1^{-}O_{\lambda}O_{\beta}h_{\alpha}^{-}O^{\beta}G_{\alpha}^{-1}$ $\int_{0}^{1}O_{\lambda}O^{\alpha}h_{\alpha}^{-1} - h_1^{-}O_{\lambda}O^{\alpha}$ $\int_{0}O^{\alpha}O^{\beta}h_{\alpha}^{-1} + h_1^{-}O_{\lambda}O^{\beta}h_{\lambda}^{-1}$ $\int_{1}^{1}O_{\lambda}O^{\beta}h_{\alpha}^{-1}O_{\lambda}O^{\beta}h_{\lambda}^{-1}$ $\int_{1}^{1}O_{\lambda}O^{\beta}h_{\alpha}^{-1}O_{\lambda}O_{\beta}h_{\lambda}^{-1}$ $\int_{1}^{1}O_{\lambda}O^{\beta}h_{\alpha}^{-1}O_{\lambda}O_{\beta}h_{\lambda}^{-1}$ $\int_{1}^{1}O_{\lambda}O^{\beta}h_{\alpha}^{-1}O_{\lambda}O_{\beta}h_{\lambda}^{-1}O_{\lambda}O_{\beta}h_{\lambda}^{-1}O_{\lambda}O_{\beta}h_{\lambda}^{-1}O_{\lambda}O_{\lambda}O_{\beta}h_{\lambda}^{-1}O_{\lambda}O_{\lambda}O_{\lambda}O_{\beta}h_{\lambda}^{-1}O_{\lambda}O_{\lambda}O_{\lambda}O_{\lambda}O_{\lambda}O_{\lambda}O_{\lambda}O_{\lambda$	$^{\beta}h_{\chi}^{\delta} + 4h_{1}^{O} \cdot ^{\partial}\partial_{\alpha}h^{\alpha\beta} \partial_{\delta}G^{\alpha}$ $^{\partial}\partial_{\lambda}h_{\alpha}^{\delta} - 8h_{1}^{O} \partial_{\beta}g^{\alpha\beta\gamma} \partial_{\delta}\partial_{\gamma}h^{\delta}$ $^{\delta}\partial_{\lambda}h_{\alpha}^{\delta} - 4h_{1}^{O} \cdot ^{\partial}\partial_{\gamma}h^{\delta}$ $^{\delta}\partial_{\gamma}h_{\beta}^{\delta} - 4h_{1}^{O} \cdot ^{\partial}\partial^{\beta}h_{\alpha}^{\alpha} \partial_{\delta}\partial_{\gamma}h^{\delta}$ $^{\alpha}\partial_{\gamma}h_{\beta}^{\delta} - 4h_{1}^{O} \cdot ^{\partial}\partial^{\beta}h_{\alpha}^{\alpha} \partial_{\delta}\partial_{\gamma}h^{\delta}$ $^{\alpha}\partial_{\gamma}h_{\beta}^{\delta} + 2h_{1}^{O}\partial_{\gamma}h_{\alpha}h^{\beta} \partial_{\delta}\partial_{\gamma}h_{\alpha}h^{\beta}$ $^{\alpha}\partial_{\gamma}h_{\beta}^{\delta} + 2h_{1}^{O}\partial_{\gamma}h_{\alpha}h^{\beta} \partial_{\delta}\partial_{\gamma}h_{\alpha}h^{\beta}$	οχ <sub>α</sub> αβ <sub>α</sub> ος κ, y, z]α	$^{\perp}\mathcal{A}_{S^{\perp}} + ^{\alpha\beta}$		$-\frac{k^2 (h_{12} + 6)}{6}$							
$\partial_{\beta}h^{\chi}_{\chi} + $	<b>X</b>	$\partial_{x}\partial^{x}h^{\beta}$		$\begin{pmatrix} 6+4h \\ 12 \\ 4 \end{pmatrix} = \begin{pmatrix} 8h \\ 6 \end{pmatrix}$ $\begin{pmatrix} h \\ 3 \end{pmatrix} = 4h$ $\begin{pmatrix} h \\$		$\mathcal{A}_{S}^{\parallel} + \alpha^{\alpha\beta\chi}$	0		0	0	$\frac{a}{\overset{\circ}{0}}$				
qαβ θ (4)	4 h. 0	ha	$x^{\beta} + 4$ $x^{\beta$	$\int_{a}^{a} \partial_{s} \partial_{b} h_{x}^{\delta} ds $	ž 4 (*	2·W <sub>S</sub> αβχ 0	0 0 41 4,0								
2 4. 5 0 a 0.3	$\partial_{\chi}\partial_{\alpha}h^{\delta}_{\ \delta} +$	<sub>B</sub> -2 a	2 h. 22 h. 32 Bx 6 2 Bx 2 Bx 6 3 BoS 2 BoS 2	аву (аву 1, ав 1, ав 1, ав 1, ав	6 8		(2,0)							h.))-3 a.)	
$h_{\alpha\chi} + 2$	o o o y	$y_{\chi}\partial^{\chi}h_{\alpha}$	0 g g x x x	$\frac{\partial^{\chi} \mathcal{A}^{\alpha}}{\partial^{\mu} \mathcal{A}^{\alpha}}$ $\frac{\partial^{\chi} \mathcal{A}^{\alpha}}{\partial^{\chi} h^{\alpha \beta}} \frac{\partial^{\chi} \mathcal{A}^{\alpha}}{\partial^{\chi} h^{\alpha \beta}} \frac{\partial^{\chi} \mathcal{A}^{\alpha}}{\partial^{\alpha} h^{\alpha}} $	2 х <sub>Я</sub> а в дхдв дхдв	h. +h.)	4,1,1,2,1 0,0,0 0,0,0					++ ))	7 8 7 1,)+3a,	+ h.)	
$(a^{\beta \chi} \partial_{\mu} + \chi^{\beta})$	, 088°	h <sup>aβ</sup>	$4 h$ $12$ $1 \theta^{\chi} \delta^{\chi} \delta^{$	+4 h  5 +8 h  1 h  2 h  3 a  4 4 h  1 h  4 4 h  1 h  4 4 h  4 h  4	4 h d	αβ 12 0 12 0	12 + 2 ( n / 1					$0^{+}\mathcal{A}_{S}^{\perp h}$ $0$ $i  k^{3} (12h - 5(h)$	$     \begin{array}{c}                                     $	12 √2 -7 (h	
P. 9.	+4 1	+2 a	$\partial_{x}G_{a}^{a}_{p} + 4h_{1,2}\partial_{x}\partial_{x}h^{a}_{a}$ $h^{a\beta} + a_{0}\partial_{x}h_{a\beta}\partial^{y}h^{a}_{a}$ $R_{a}^{a}_{x} + 4h_{1,2}\partial^{x}G_{a}^{a}_{p}$ $a_{0}\partial_{x}h_{x}^{a} + 4h_{1,2}\partial^{x}G_{x}^{a}_{p}$ $A_{0}\partial_{y}h_{x}^{b} + 4h_{1,2}\partial^{x}G_{x}^{a}_{p}$ $A_{0}\partial_{y}h_{x}^{b} + 2h_{1,2}\partial^{x}G_{x}^{a}_{p}$	\$0\$hx \$0\$phx \$0\$	3°h <sub>BX</sub> 3°3°h <sub>BX</sub>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	34 34 0					i k³ (12	$     \frac{12}{4} \frac{7}{\sqrt{6}} $ $     \frac{a}{4} \frac{a}{\sqrt{2}} $ $     2 k^{2} (-4h + +h +h) + 3a} $	16 // .	${}^{3}\mathcal{A}_{S}{}^{\parallel}{}_{\alpha\beta\chi}$
$a \times a = a$	o Xaah <sup>6</sup> s	xθ <sub>β</sub> h <sup>δ</sup> <sub>δ</sub>	66 84 8 68 94 8 68 96 94 8 84 96 8 84 96 8 84 96 8	$A^{\alpha}_{\alpha}^{\beta} \partial_{\beta}$ $\partial^{\beta} h^{\alpha}_{\alpha} \partial_{\beta}$ $A^{\alpha\beta} \partial_{\delta} \partial_{\beta}$ $A^{\alpha\beta} \partial_{\delta} \partial_{\beta}$ $A^{\alpha\beta} \partial_{\delta} \partial_{\beta}$ $A^{\alpha\beta} \partial_{\delta} \partial_{\beta}$	1 a B O S S S S S S S S S S S S S S S S S S	$4i \sqrt{\frac{2}{3}} k(2k^2h_2^{-2} + 3h_2 a_1 - 2(h + h_1)a_1) $ $a_1 \sqrt{\frac{2}{3}} k(2k^2h_2^{-2} + 3h_2 a_1 - 2(h + h_1)a_2) $ $a_2 \sqrt{\frac{2}{3}} \sqrt{\frac{2}}} \sqrt{\frac{2}{3}} \sqrt{\frac{2}{3}} \sqrt{\frac{2}{3}} \sqrt{\frac{2}}} \sqrt{\frac{2}{3}} \sqrt{\frac{2}}} \sqrt{\frac{2}{3}} \sqrt{\frac{2}}} \sqrt{\frac{2}} \sqrt{\frac{2}}} \sqrt{\frac{2}} \sqrt{\frac{2}}} \sqrt{\frac{2}} \sqrt{\frac{2}}} \sqrt{\frac{2}}} \sqrt{\frac{2}}} \sqrt{\frac{2}}} \sqrt{\frac{2}} \sqrt{\frac{2}}} \sqrt{\frac{2}}} \sqrt{\frac{2}}}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$							$\frac{1}{12} (k^2 (16h_1 - 7(h_1 + \frac{1}{7})^2))$	$\mathcal{A}_{S}^{\parallel} \dagger^{\alpha\beta\chi} \qquad -\frac{a_{0}}{2}$
$S == \iiint (\frac{1}{8} (-4a_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}^{\ \chi} - 3  a_0  \mathcal{A}^{\beta\chi} + 2  a_0  \mathcal{A}^{\gamma\chi} + 2  a_0  \mathcal{A}^{\chi\chi} + 2  $	$2a \mathcal{A}_{0}^{\alpha\beta} (2\mathcal{A}_{\beta\chi}^{X} - 2\partial_{\beta}h_{\chi}^{X} + 2\partial_{\chi}h_{\beta}^{X}) - 4h \mathcal{A}_{12} \partial_{\beta}\mathcal{A}^{\alpha\beta\chi} \partial_{\chi}\partial_{\alpha}h_{\delta}^{\delta} + 4h \mathcal{A}_{1} \partial_{\beta}\mathcal{A}^{\alpha\beta\chi}$	$4a_0^{}h^{\alpha\beta}\partial_\chi\partial_\beta h_\alpha^{}{}^x+2a_0^{}h^\alpha^{}a^{}\partial_\chi\partial_\beta h^{\beta\chi}+4h^{}{}_1\partial_\alpha\mathcal{F}^{\alpha\beta\chi}\partial_\chi\partial_\beta h^\delta_{}+2a_0^{}_1h^{\alpha\beta}\partial_\chi\partial^\chi h_{}$	$ 4h_{1,0} \partial_{\rho} \mathcal{A}_{x}^{\alpha} \partial_{\rho} \mathcal{A}_{x}^{\alpha} \partial_{\rho} - 4h_{1,0} \partial_{\lambda} \mathcal{A}_{y}^{\alpha} \partial_{\rho} \mathcal{A}_{x}^{\alpha} - 4h_{1,0} \partial_{\lambda} \mathcal{A}_{y}^{\alpha} \partial_{\rho} \mathcal{A}_{x}^{\alpha} \partial_{\rho} \mathcal{A}_$	$ \begin{aligned} 4h_{12} & \partial^{\lambda}\mathcal{G}_{\alpha}^{\alpha}{}^{\beta}\partial_{\partial}\partial_{\beta}h_{\lambda}^{\ \ \ } + 4h_{1}\partial^{\lambda}\mathcal{G}_{\alpha}^{\alpha}{}^{\beta}\partial_{\partial}\partial_{\beta}h_{\lambda}^{\ \ \ } + 4h_{1}\partial^{\lambda}\mathcal{G}_{\alpha}^{\alpha}{}^{\beta}\partial_{\partial}\partial_{\beta}h_{\lambda}^{\ \ \ } + 4h_{1}\partial^{\lambda}\mathcal{G}_{\alpha}^{\alpha}{}^{\beta}\partial_{\partial}\partial_{\beta}h_{\lambda}^{\ \ \ \ } + 4h_{1}\partial^{\lambda}\mathcal{G}_{\alpha}^{\alpha}{}^{\beta}\partial_{\beta}\partial_{\beta}h_{\lambda}^{\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $									, n		$3\mathcal{M}_{S} \ _{\alpha\beta\chi}$
4 a. h	$h$ $\theta_{\beta}$	$h_{12}^{}\partial_{\alpha}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$h_{x}^{\delta} + 4$ $h_{x}^{\delta} + 5$ $h_{x}^{\delta} + 5$ $h_{x}^{\delta} + 4$	ωχ h <sub>βχ</sub> -4		$ \frac{2\sqrt{2} k^2 (2k^2 h_1^2 + k^2 h_1^2 h_2^2 h_3^2)}{3a_0^3} \frac{3a_0^3}{3a_0^3} 3a_$					ξ, l	$\frac{\frac{7}{2}\sqrt{3}}{\frac{a_0}{2}}$ $\frac{\frac{a_0}{2}}{\frac{2}{2}}$	$\frac{2}{2} \frac{k^2 \left(-4 \frac{h_1}{h_2} + h_2 + h_3 + 3 \frac{a_0}{h_2}\right)}{12 \sqrt{2}}$	3. J
$h_{\alpha\beta}$ +	ο γ <sub>β</sub> )-4	βX +4	Sy S	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	β 3 <sub>6</sub> 3 <sup>6</sup> η <sup>α</sup> 3 <sub>6</sub> 6	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	+1, +1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1					0 g l	$\frac{2\sqrt{3}}{2}$	4 + + + + + + + + + + + + + + + + + + +	3.W <sub>s</sub>   † abx
3 Tab	" +2 <i>ð</i> <sub>x</sub> /	$\partial_{x}\partial_{\beta}h$	$\chi^{\mathcal{A}_{\beta}}$	OX Aa Baabaa Ax Ob ha aa baabaa aa baabaa aa baabaa aa baabaa	3×34α 2 3×3β	$2^{+}\mathcal{W}_{S} _{\alpha\beta}^{2}$ $k^{2}h^{-2}(h+h)$ $\sqrt{3}a^{-3}$	34.3 34.3 34.3 34.3 34.3 34.3 30					0	2, 2,	3 ° 2 k² (	
αβχ +8	ο <sub>β</sub> h <sup>X</sup> .	a, h <sup>a</sup>	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	+4 h, +2 h, 6 +4 h, 6	+4 h 12 +4 h	4 i k(k	$ \begin{array}{c} -2x & \kappa_{12} + 2x & (x_{11} + \kappa_{1} + \kappa_{1} + \kappa_{1} + \kappa_{1} + \kappa_{2} + 0 - a_{1} \\ -2x & 3a & 3 \\ 3a & 3a & 3a \\ 0 \end{array} $					0+A <sub>S</sub> <sup>⊥t</sup>	0 0 0	$\frac{a}{2}$ $\frac{4\sqrt{2}}{\sqrt{2}}$	Multiplicities  1 3 4
$_{eta}$ $_{eta^{ab\chi}}$ +8 $_{eta^{ab\chi}}$ $_{eta_{ab\chi}}$ +2 $_{a}$ , $_{ab\chi}$ -4 , $_{ab\chi}$	X XX -XX	$\alpha^{x} + 2$	$A^{\alpha}_{\alpha}$ $A^{\alpha}_{\alpha}$ $A^{\alpha}_{\alpha}$ $A^{\beta}_{\beta}$ $A^{\beta}_{\beta}$ $A^{\beta}_{\beta}$	$^{\circ}\partial_{\beta}h_{\chi}^{\circ}$ $^{\circ}\partial_{\beta}h_{\chi}^{\circ}$ $^{\circ}\partial_{\gamma}h_{\alpha}^{\circ}$ $^{\circ}\partial_{\chi}h_{\beta}^{\circ}$ $^{\circ}\partial_{\chi}h_{\beta}^{\circ}$ $^{\circ}\partial_{\gamma}h_{\alpha\gamma}^{\circ}$	oons oons oons	4							0 0		Multi 1 3 3 4
+8 A	β (2	$\partial_{x}\partial_{\beta}h$	A x 6 9 X 6 6 9 X 6 6 9 X 6 6 9 X 9 6 6 9 X 9 6 7 8 9 8 9 8 8 9 8 8 9 8 9 8 9 8 9 8 9 8	$\mathcal{A}^{\alpha\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$ $\delta^{\beta}_{\alpha\beta}$	х h <sup>ав</sup> д <sub>б</sub> Э <sub>а</sub> h <sup>ав</sup> б	0 0 0	$41(\frac{1}{\sqrt{3}} \times (2k^2 + \frac{1}{2} \times (k^2 + \frac{1}{6} \times k)) + (k^2 + \frac{1}{2} \times (k^2 + \frac{1}{2} \times (k^2 + \frac{1}{6} \times k)) + (k^2 + \frac{1}{2} \times (k^2 + \frac{1}{6} \times k)) + (k^2 + \frac{1}{2} \times (k^2 + \frac{1}{6} \times k)) + (k^2 + \frac{1}{6} \times (k^2 + \frac{1}{6} \times k)) + (k^2 + 1$						$ \begin{array}{c} = k^{k} \left(k^{k} \left(4h \cdot -2 \left(h \cdot + h \cdot \right)\right) + a \cdot \right) \\ 0 \\ 0 \\ i k^{2} \left(h_{7} + h_{3}\right) \\ i k^{2} \left(h_{7} + h_{3}\right) \end{array} $	-h.))	form λοχοβηταρ rs:
Aabx a nab	o. R.	a. h <sup>aβ</sup>	$ \begin{array}{cccc} h & \partial_{\beta} & \\ h & \partial_{\lambda} \partial_{\beta} \\ \partial_{\lambda} \partial_{\beta} h & \\ h & \partial^{\lambda} \mathcal{G}_{\beta} \\ h & \partial^{\lambda} \mathcal$	$4h. \partial^x \mathcal{A}^a \beta^b$ $4h. \partial^x \partial^b h^a$ $8h. \partial_b \mathcal{A}^{abx} \partial$ $4h. \partial^x \mathcal{A}^a \partial^b$ $2h. \partial^x \partial^b h^a$ $4h. \partial_b \mathcal{A}^{abx}$	$ \begin{array}{ccc} 12 & \\ h & \partial_{\alpha}\partial \\ 8 & \\ h & \partial^{X}G \\ 12 & \\ \end{array} $	3 7 8 7 8	4 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					η, ο μ 1 μ, ο	$\frac{2(h+1)}{12}$ $i \stackrel{?}{k} \stackrel{?}{(h+1)}$	2 \(\frac{3}{12}\) 4 \(\sigma\)	ant 0 == $\hat{a}\hat{\sigma}$ ators:
Aax B	2	4	4 4 4 8 2	4 4 8 4 7 4	2 4	$ \begin{array}{c} 2^{+}\mathcal{T} \parallel_{\alpha\beta} \\ (2h_{12} + h_{12} \\ k^{2}a_{0} \\ \frac{2}{3} + \frac{1}{3} \end{array} $	$\frac{\sqrt{3}  a_0^3}{\sqrt{3}  a_0^3} \times (2  k^2  h_1^2  k^3  h_1^2  a_0^2  2  (2  k^2  h_2^2  k^3  h_1^2  a_0^2  a_0^2  2  (2  k^2  h_2^2  k^3  h_1^2  a_0^2  $					0	12	$ \begin{array}{c c} 2 \sqrt{3} \\ i k^{3} (12 h_{12} - 5 (h_{7} + h_{8})) \\ 4 \sqrt{6} \end{array} $	n Covariant form $\partial_{\beta}\partial_{\alpha}\mathcal{T}^{-\alpha\beta} = 0$ $\partial_{\chi}\partial_{\beta}\mathcal{T}^{-\beta\chi} = \hat{\mathcal{A}}^{\lambda\chi}\partial_{\beta}\mathcal{T}$ auge generators:
-4a.						$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	k(2 k <sup>2</sup> h					0	0	,	form Covariant $ \frac{\partial_{\beta}\partial_{\alpha}\mathcal{T}^{\alpha\beta}}{\partial_{\lambda}\partial_{\beta}\partial^{\alpha}\mathcal{T}^{\beta\lambda}} = 0 $ $ \frac{\partial_{\lambda}\partial_{\beta}\partial^{\alpha}\mathcal{T}^{\beta\lambda}}{\partial_{\alpha}\partial_{\alpha}\partial^{\alpha}\mathcal{T}^{\beta\lambda}} = 0 $ :d gauge generator
$\iint (\frac{1}{8})$						8(-k <sup>4</sup>	4 i $\sqrt{\frac{2}{3}}$								y for
∭= .						2, T   † aβ	+ + abx + abx					0			Spin-parity form Covariant form $0^{+}\mathcal{T}^{\perp} = 0$ Total expected gauge generators:
S						$^{2^{+}}\mathcal{T}$	$2^{+}\mathcal{W}_{s} + ^{\alpha\beta}$ $2^{+}\mathcal{W}_{s} + ^{\alpha\beta}$ $2^{+}\mathcal{W}_{s} + ^{\alpha\beta\chi}$					+ <sub>+</sub> <sub>+</sub> <sub>0</sub>	$0^+h^{\parallel}$ + $0^+\mathcal{A}_{s}^{\perp t}$	7	Spin $0^+\mathcal{T}^{-1}$ $1\mathcal{T}^{-1}$ Tota

## Massive and massless spectra

Parity:	Spin:	Square mass:	Poleresidue:			? $k^{\mu} = (p, 0, 0, p)$ ?					
Odd	1	$\frac{3a}{h-h} > 0$	576 h 2 144 h 12 (h 17)	Massive particle	$J^P = 1^-$ $k^\mu = (\mathcal{E}, 0, 0, p$	? ? Massless particle					
			$\frac{h_{12}(h_1-h_1)+34(h_1-h_1)^2}{(h_1-h_1)^3}$ $\frac{(h_1-h_1)^3}{(h_2-h_1)^3}$	rticle		Pole residue: $-\frac{1}{\frac{a}{6}} > 0$ Polarisations: 2					
			$\left(\frac{h-h}{7}\right)^{2} > 0$								

## **Unitarity conditions**

$$(h. \mid h.) \in \mathbb{R} \&\& a. < 0 \&\& h. < h.$$