## **PSALTer results panel**

## Wave operator and propagator

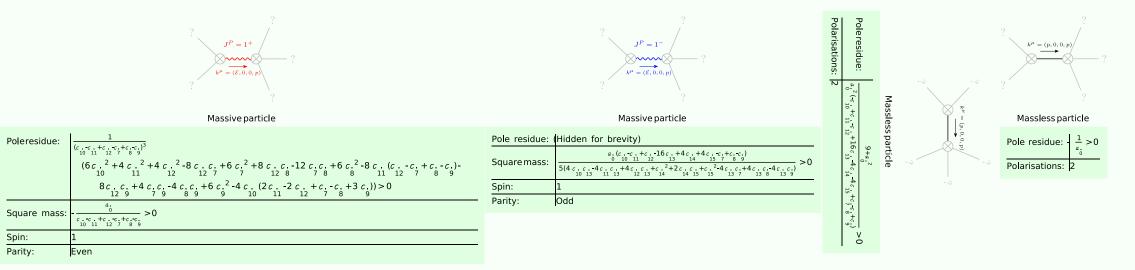
 $S = \{\{\{\{\{g,T^m\},g_{a}\}_{a}^{*}\},\{a,G_{a}\}_{a}^{*}$ 

	-'. ℋ <sub>a</sub> " <sub>αβ</sub>	$\mathcal{H}_{a^{\perp}\alpha\beta}$	$^{\perp}$ $\mathcal{H}_{S^{^{\perp}}\alpha\beta}$	$h^{\perp}_{\alpha}$	$\div \mathcal{H}_{a}$ " $_{\alpha}$	$+3\mathcal{H}_{a}^{+}_{\alpha}$	$+\mathcal{H}_{s^{\perp}\alpha}$	$+\mathcal{H}_{S}^{IL}{}_{\alpha}$	$\mathcal{H}_{S}^{L''}{}_{\alpha}$	÷ ℋ <sub>S</sub> "'' <sub>α</sub>	
$^{1^{+}}\mathcal{A}_{a}{}^{\parallel}\dagger^{^{lphaeta}}$	$\frac{1}{4} \left( -a \cdot + \left( c \cdot + c \cdot - c \cdot - c \cdot - c \cdot + c \cdot - c \cdot \right) k^2 \right)$	$-\frac{a_{0}}{2\sqrt{2}}$	$\frac{1}{4} \left( -c_{10} - c_{17} + c_{18} + c_{19} \right) k^{2}$	0	0	0	0	0	0	0	$^{0^+}\mathcal{T}^{\scriptscriptstyle \perp}$
$^{1^{+}}_{\cdot}\mathcal{A}_{a^{\perp}}^{}^{\dagger}$	$-\frac{\frac{a_0}{2}}{2\sqrt{2}}$	0	0	0	0	0	0	0	0	0	<sup>0,+</sup> √″
${}^{1}^{+}\mathcal{R}_{S}{}^{\perp}\dagger^{lphaeta}$	$\frac{1}{4} \left( -c_{.0} - c_{.7} + c_{.8} + c_{.9} \right) k^2$	0	$\frac{1}{4} \left( a_0 + \left( c_{10} - c_{11} + c_{12} - c_{1} + c_{8} - c_{1} \right) k^2 \right)$	0	0	0	0	0	0	0	$^{0^+}\mathcal{W}_a{}^{\parallel}$
$^{1}$ $h^{\perp}$ $\dagger^{\alpha}$	0	0	0	0	0	0	0	0	0	0	
$^{1}\mathcal{A}_{a}{}^{\parallel}\dagger^{\alpha}$	0	0	0	0	$\frac{1}{4} \left( -a. + 2 \left( ccc. \right) k^2 \right)$	$\frac{a_0}{2\sqrt{2}}$	$\frac{\frac{(-2c_{.10}+c_{}c_{}+2c_{.})k^2}{10^{14}^{15}}}{4\sqrt{3}}$	$\frac{1}{4}\sqrt{\frac{5}{3}}\left(c_{14}-c_{15}-2c_{7}+2c_{9}\right)k^{2}$	$\frac{\frac{(-2c_1+c_2-c_1+2c_3)k^2}{10^{14} 15}}{2\sqrt{6}}$	$\frac{(c_{14} + c_{7} + c_{7} + c_{9})^{2}}{2\sqrt{3}}$	0,+W <sub>s</sub> ±t
$^1\mathscr{R}_{a^\perp} \dagger^lpha$	0	0	0	0	$\frac{\frac{a}{6}}{2\sqrt{2}}$	0	0	0	0	0	${}^{0^+}\mathcal{W}_{S}{}^{\parallel}$
$^{1}\mathcal{A}_{s}^{^{\perpt}}\dagger^{^{lpha}}$	0	0	0	0	$\frac{(-2c_{10} + c_{14} - c_{15} + 2c_{1})k^{2}}{4\sqrt{3}}$	0	$\frac{1}{6} \left( -2a \cdot -(c \cdot +2c \cdot -c \cdot -c \cdot +c \cdot +c \cdot +c \cdot )k^{2} \right)$	$\frac{1}{6}\sqrt{5}\left(a.+(c.+c2c.+c.+c.+c.+c.)k^2\right)$	$\frac{-\frac{a2(c.+2cc.+c.+c.+c.+c.)k^2}{11}\frac{-6\sqrt{2}}{6\sqrt{2}}$	$\frac{1}{12} \left( -2 a. + (-2 c2 c8 c. + c. + c2 c.) k^2 \right)$	<sup>0+</sup> Ws <sup>+h</sup>
${}^{1}\mathcal{A}_{S}{}^{It}t^{\alpha}$	0	0	0	0	$\frac{1}{4} \sqrt{\frac{5}{3}} \left( c_{14} - c_{15} - 2 c_{1} + 2 c_{1} \right) k^{2}$	0	$\frac{1}{6}\sqrt{5}\left(a.+\left(c+c2\ c+c+c+c\right)k^{2}\right)$	$\frac{1}{6} \left( 2a 5(c. + 2c c. + c. + c.) k^2 \right)$	$-\frac{1}{6}\sqrt{\frac{5}{2}}\left(a_{0}-2\left(c_{1}+c_{1}-2c_{1}+c_{1}+c_{1}+c_{1}+c_{1}\right)k^{2}\right)$	$\frac{1}{12} \sqrt{5} \left(-2 a. + (2 c8 c. + c. + c. + 2 (c. + c.)) k^2\right)$	$^{0}$ $W_{a}^{\parallel}$
$^{1}\mathcal{A}_{S}{^{^{\perp h}}}\dagger^{^{lpha}}$	0	0	0	0	$\frac{(-2c_{10} + c_{14} - c_{15} + 2c_{1})k^{2}}{2\sqrt{6}}$	0	$\frac{\frac{-a\cdot -2(c\cdot +2c\cdot -c\cdot -c\cdot +c\cdot +c\cdot +c\cdot )k^2}{0111131415799}}{6\sqrt{2}}$	$-\frac{1}{6}\sqrt{\frac{5}{2}}\left(a 2\left(c. + c 2c. + c. + c. + c.\right)k^{2}\right)$	$\frac{1}{3} \left( a \left( c. + 2 c c c. + c. + c. + c. \right) k^2 \right)$	$\frac{a \cdot + (-2c \cdot -2c \cdot -8c \cdot +c \cdot +c \cdot -2c \cdot )k^{2}}{6 \sqrt{2}}$	$^{0^{+}}h^{\perp}$
$^{1}\mathcal{A}_{s}^{llh}\dagger^{\alpha}$	0	0	0	0	$\frac{(c_{.1}-c_{.1}+c_{.7}-c_{.9})k^{2}}{2\sqrt{3}}$	0	$\frac{1}{12} \left( -2a. + (-2c2c8c. +c. +c2c.)k^2 \right)$	$\frac{1}{12} \sqrt{5} \left(-2 \ a_{.} + \left(2 \ c_{.} - 8 \ c_{.} + c_{.} + c_{.} + c_{.} + 2 \ (c_{.} + c_{.})\right) k^{2}\right)$	$\frac{a_0 + (-2c_0 - 2c_2 - 8c_1 + c_1 + c_2 - 2c_2)k^2}{6\sqrt{2}}$	$\frac{1}{12} \left( 5 a2 \left( c. +8 c. +2 c. +2 c. +c. +c. +c. \right) k^2 \right)$	0. h <sup>±</sup> 1

$^{1}\mathcal{A}_{s}^{\parallel h}\dagger^{\alpha}$		0		0	
Spin-parit	y form	Covariar	t form		Multiplicities
$0^{+}W_{s}^{\parallel} + 2$	$2.0^{+}W_{s}^{\perp h} + 3.0$	$Q^+W_s^{\perp t} == 0$	$\partial_{\alpha}W^{\alpha\beta}_{\beta} == 0$		1
$0^+\mathcal{T}^\perp == 0$			$\partial_{\beta}\partial_{\alpha}\mathcal{T}^{\alpha\beta}=0$		1
$^{1}\mathcal{T}^{_{\perp}{}^{lpha}}==0$	)		$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\mathcal{T}^{\beta\chi}=$ =	$\partial_{\!\chi}\partial^{\chi}\partial_{eta}\mathcal{T}^{lphaeta}$	3 3
Total expe	ected gauge (	generators:			5
	3-41	3.0	ii .		

	$"W_{S}"_{\alpha\beta\chi}$		$^{3}\mathcal{H}_{s}^{"}_{\alpha\beta\chi}$
$^{3}$ $W_{s}$ $^{\parallel}$ $\dagger$ $^{\alpha\beta\chi}$	- <u>2</u> a. 0	${}^{3}\mathcal{A}_{s}{}^{\parallel}\dagger^{\alpha\beta\chi}$	$-\frac{a}{2}$

## **Massive and massless spectra**



## **Unitarity conditions**

(Timeout after 20 seconds)

		0. T	T 0, T	${}^{0}$ ' $\mathcal{W}_{a}$	<u> </u>	${}^{0}$ ${}^{\prime}$ ${}^{\prime}$ ${}^{\prime}$ ${}^{\prime}$		<sup>0,</sup> '₩ <sub>s</sub> "	0, W	\s_ <sub>TU</sub>	<sup>0</sup> W <sub>a</sub> <sup>∥</sup>	_		$^{2,+}h^{\parallel}_{\alpha\beta}$			$^{2^{+}}\mathcal{A}_{a}{}^{\parallel}{}_{\alpha\beta}$	<sup>2</sup> .⁴ <i>Я</i> ?	αβ		2,+ <i>G</i>	₹ <sub>s</sub> <sup>⊥</sup> αβ	$^{2}\mathcal{A}_{a}^{\parallel}_{\alpha}$	ιβχ 7
	<sup>0+</sup> 7⁻¹ †	0	-	0	0 0			0		)	Ü		$k^{2}(a_{1}+(a_{2}))$	· - C · - C ·	$(c + c + c + c + c) k^{2}$ $\frac{i(c - c - c)}{7} = \frac{i(c - c) - c}{10^{2} \cdot 11}$		$\frac{i\left(c_{}c_{}c_{}+c_{}+c_{}+c_{}\right)k^{3}}{10\ 11\ 12\ 7\ 8\ 9}$	i (ccc 10 7	+c.) k <sup>3</sup>		i (cc.	$\frac{-c_8 + c_9) k^3}{\sqrt{6}}$	0	T
	<sup>0+</sup> ∕7″†	0	$\frac{4(a.+2(ccc.+c.+c.+c.+c.)k^2)}{\frac{a.^2k^2}{0}k^2}$	$-\frac{4i\sqrt{2}(c_{10}c_{11}c_{11}c_{12})}{a_{0}^{2}}$	+c.+c.+c.) k	$\frac{i\sqrt{3}(c_{10}-c_{10}-c_{10}+c_{1})k}{a_{0}^{2}}$		$-\frac{i(c_{10} - c_{10} - c_{10} + c_{1})k}{\sqrt{3} a_{0}^{2}}$	$-\frac{i\sqrt{\frac{2}{3}}(c_{10}c_{10})}{a_{0}}$	cc.+c.)k 7 8 9 2	0	$2^{+}\mathcal{R}_{a}^{\parallel}+^{\alpha\beta}$		ccc.+c.+	a +a \ \ \ \ 3		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	4 1	3		(-c_+c_	+cc.) k <sup>2</sup>	0	+
	<sup>0,+</sup> W <sub>a</sub>   †	0	$-\frac{4i\sqrt{2}(-c_1+c_1+c_2-c_1-c_2-c_3)k}{a_1^2\choose 0}$	$-\frac{2(a_{0}-2(c_{10}-c_{11}-c_{11}+c_{12})}{a_{0}^{2}}$	$\frac{-c.+c.+c.)k^2}{7}$	$\frac{\sqrt{\frac{3}{2}} \left( -c_{10} + c_{1} + c_{1} + c_{1} - c_{1} \right) k^{2}}{a_{0}^{2}}$		$\frac{(c_{10} - c_{1} - c_{1} + c_{1}) k^{2}}{\sqrt{6} a_{0}^{2}}$	$\frac{\binom{c_{10} - c_{10} - c_{10}}{78}}{\sqrt{3} \ a}$	$\frac{+c.)k^2}{a.0}$	0	$^{2^{+}}\mathcal{R}_{s}^{\parallel}$ † $^{\alpha\beta}$		$ \begin{array}{c} 4 \sqrt{2} \\ \frac{i(c_{10} - c_{7} - c_{8} + c_{10})}{4 \sqrt{3}} \end{array} $		0 :	$ \frac{(c_{}-c_{,7}-c_{,+}+c_{,j})k^{2}}{2\sqrt{6}} $	$\frac{1}{6} \left( -3  a \cdot -(c \cdot + c \cdot + $		)	(c +c +c	$ \frac{\sqrt{3}}{+c_1+c_2+c_9)k^2} $ $ \sqrt{2} $	0	1
	<sup>0,+</sup> Ws <sup>⊥t</sup> †	0	$\frac{i\sqrt{3}(-c.+c.+cc.)k}{a.^{2}_{0}}$	$-\frac{\sqrt{\frac{3}{2}} \left(c_{10} - c_{7} - c_{8} - c_{10}\right)}{a_{0}^{2}}$	$\frac{\frac{3(a_0-2(c_0+c_0+c_0+c_0+c_0+c_0+c_0+c_0)}{3(a_0-2(c_0+c_0+c_0+c_0+c_0+c_0+c_0+c_0+c_0+c_0+$		+c.) k <sup>2</sup> )	$\frac{5a 2(c. + c. + c. + c. + c. + c. + c.)k^{2}}{4a.^{2}_{0}}$	$-\frac{a_0+2(c_0+c_0+c_0+c_0)}{2\sqrt{2}}$		$0 \qquad 2^{+}_{\cdot} \mathcal{A}_{S^{\perp}} \uparrow^{\alpha\beta}$		$\frac{i(c, -c, -c, +c, )k^3}{4\sqrt{6}}$			$\frac{(-c_1 + c_2 + c_3 - c_4) k^2}{4 \sqrt{3}}$		(- 1- 1- 1-1-1-);2		$\frac{1}{12} \left( 3a \left( c. + c. + c. + c. + c. + c. + c. \right) k^2 \right)$		e <sup>2</sup> ) 0		
	<sup>0,+</sup> Ws <sup>  </sup> †	0	$-\frac{i(-c_{.10}+c_{.7}+c_{.7}+c_{.7}c_{.9})k}{\sqrt{3}a_{.0}^{2}}$	$\frac{(c_{10} - c_{10} - c_{10} + c_{10})}{\sqrt{6} a_{0}^{2}}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		-c.) k <sup>2</sup>	$\frac{-9 a. + 2(c. + c. + c. + c. + c. + c. + c. + c.) k^{2}}{12 a.^{2}}$	-3a.+2(c.+c.+c+c+c+c+c+c+c+c+c+c+c+c+c+c+c+c+c		U	$^{2}\mathcal{A}_{a}^{\parallel}$ † $^{\alpha\beta\chi}$	0			0	(	0		0		a. 0 4		
c.) k <sup>2</sup> )	<sup>0,+</sup> Ws <sup>±h</sup> †	0	$\frac{i\sqrt{\frac{2}{3}}(-c.+c.+c.c.)k}{a^{2}}$	$\frac{\binom{c - c - c + c}{10 \ 7 \ 8}}{\sqrt{3} \ a^2}$	$\begin{bmatrix} -c_0 \\ 2 \end{bmatrix}^{k^2} = \begin{bmatrix} -\frac{a_0 + 2(c_0 + c_1 + c_2 + c_3 + c_4)}{10} \\ -\frac{a_0 + 2(c_0 + c_1 + c_4)}{10} \\ -\frac{a_0 + 2(c_0 + c_4)}{1$		-c.) k <sup>2</sup>	$\frac{-3 a. + 2(c. + c. + c. + c. + c. + c. + c. + c.) k^{2}}{6 \sqrt{2} a.^{2}}$	$\frac{k^2}{6a} = \frac{3a_0 + 2(c_{10} + c_{11} + c_{12} + c_{7} + c_{8} + c_{9})k^2}{6a_0^2}$		0	$^{2}\mathcal{A}_{s}^{\parallel}$ † $^{\alpha\beta\chi}$	0 2+cr		2 <sup>+</sup> τ" <sub>αβ</sub>		0 2+Wa <sup>  </sup> αβ	2+W <sub>S</sub>    <sub>αβ</sub>	$0$ $2^+W_S^{\parallel}_{\alpha\beta} \qquad \qquad 2^+W_{S^{\perp}\alpha\beta}^{\perp}$		$^{2}W_{a}^{\parallel}_{\alpha\beta\chi}$	0 	0	
+ c.)) k <sup>2</sup> )	<sup>0-</sup> Wa <sup>∥</sup> †	0	0	0		0		0	0		_ <u>2</u> 			$\overset{2^+}{\cdot}\mathcal{T}^{\parallel}\dagger^{lphaeta}$	8/0 -0 -0 +0 +0 +0	$-\frac{a}{k^2}$ )	$\frac{4i\sqrt{2}(ccc.+c.+c.+c.)k}{\frac{10}{6}\frac{11}{2}\frac{12}{7}\frac{12}{8}\frac{9}{9}}$	$-\frac{4i(cc.+c.+c.)k}{\frac{10}{\sqrt{3}}a.^{2}}$	$\frac{4i\sqrt{\frac{2}{3}}(c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{10}-c_{7}-c_{7}-c_{10}-c_{7$		0	0		
2.	<sup>0+</sup> h <sup>+</sup> †	0,+h <sup>±</sup>	0 <sup>+</sup> / <sub>h</sub>			0 <sup>+</sup> A <sub>a</sub>    0 0	<sup>0+</sup> A <sub>s</sub> ⊥t	0 <sup>+</sup> A <sub>s</sub> I 0		(	0.+ A <sub>s</sub> <sup>⊥h</sup>		<sup>0</sup> -A <sub>a</sub> l	$2^+W_a^{\parallel} + \alpha^{\beta}$	$ \begin{array}{c} a. \\ 0 \\ \hline 4 i \sqrt{2} \left(-c. +c. +ccc. \\ 10 & 11 & 12 & 7 & 8 \end{array} $	:c.)k 4	$4(a.+(ccc.+c.+c.+c.)k^{2})$ $0$ $10$ $11$ $12$ $7$ $8$ $9$	$\frac{2\sqrt{\frac{2}{3}}(c_1, c_2, c_3 + c_9)k^2}{\sqrt{\frac{2}{3}(c_1, c_2, c_3 + c_9)k^2}}$	$ \frac{4(c_{10} - c_{78} + c_{10} + c_{18})}{\sqrt{3} \ a^{2}} $	c.) k <sup>2</sup>	0	0		
(2.) k <sup>2</sup> )	0.+ <i>h</i>    †	0	$\frac{1}{4}k^{2}(a_{1}-2(c_{1}-c_{1}-c_{1}+c_{1})$	$(1 + c. + c.) k^2$	i (cc . 10 1	$\frac{-c.+c.+c.+c.+c.)k^3}{\sqrt{2}}$	0	$-\frac{i(c_{10} - c_{7} - c_{8} + c_{9})k^{3}}{2\sqrt{3}}$		i (c.	2 √6	) k <sup>3</sup>	0	- 2+w <sub>s</sub> + αβ	4 i (-c. +c.+cc.) k	:	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	2(-3 a.+(c+c+c+c+c+c)	$ \begin{array}{c c}  & 0 \\  & 2 \sqrt{2} \left( c_{10} + c_{11} + c_{12} + c_{13} \right) \\  & & & & & & & & & & & & \\ \end{array} $		0	0		
	<sup>0+</sup>	0	$\frac{i(c_{10}-c_{11}-c_{11}+c_{$	$\frac{i(ccc.+c.+c.+c.+c.)k^3}{\sqrt{2}} - \frac{0}{2} - (c\frac{0}{2} - c\frac{0}{2} - c0$		$-c_{.12} + c_{.1} + c_{.1} + c_{.1} + c_{.1} k^2$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		(c		$\frac{(c_{10} - c_{7} - c_{8} + c_{9}) k^{2}}{2 \sqrt{3}}$		0	. ,,,	√3 a.²		a. <sup>2</sup>	3 a. 2		3 a. 2				
	$^{0^+}\mathcal{R}_{S^{^{\perp t}}}\dagger$	0	0			0 0		$\frac{a}{2}$			$-\frac{a}{2\sqrt{2}}$		0	$^{2^+}W_{s^{\perp}}\dagger^{\alpha\beta}$	$-\frac{4i\sqrt{\frac{2}{3}}(-c+c.+cc.9)}{a^{2}}$	<u> </u>	$-\frac{4(-c_{.10}+c_{.7}+c_{.7}+c_{.9})^{2}}{\sqrt{3}a_{.0}^{2}}$	$\frac{2\sqrt{2}(c.+c.+c.+c.+c.+c.+c.+c.)k}{3a0^2}$	4(3 a.+(c.+c.+c.+c.+c.+c.+c.+c.+c.+c.+c.+c.+c.+c	7 8 9	0	0		
	${}^{0^+}_{\cdot}\mathcal{A}_{s}{}^{\parallel}$ †	0	$\frac{i(ccc.+c.)k^3}{2\sqrt{3}}$	$\frac{\frac{-c \cdot c \cdot + c \cdot + c \cdot k^3}{57 \cdot 8 \cdot 9}}{2\sqrt{3}} \qquad \frac{\frac{(-c \cdot + c \cdot + c \cdot + c \cdot + c \cdot k^2)}{76}}{\sqrt{6}} \qquad \frac{\frac{a}{0}}{2}  -\frac{2}{3} \left(c \cdot + c \cdot $		$\frac{1}{3} + \frac{c}{9} k^2$	$\frac{-3a.+4(c.+c.+c.+c.+c.+c.+c.)k^2}{66\sqrt{2}}$		c.+c.+c.) k <sup>2</sup>	0	$^{2}W_{a}^{\parallel}\dagger^{\alpha\beta\chi}$	0		0	0	0		4 a. 0	0					
	<sup>0,+</sup> ∕Я <sub>s</sub> <sup>⊥h</sup> †	0	$\frac{i(cc.+c.)k^3}{2\sqrt{6}}$		(c <sub>1</sub>	$\frac{\frac{-cc.+c.)}{7}\frac{k^2}{8}}{2\sqrt{3}}$	$-\frac{a_0}{2\sqrt{2}}$	-3 a. +4(c. +c. +c. +c. +c. +c. +c. +c. +c. +c. +	$\frac{1}{6} (3 a_0 - 2 (c_0) + c_0)^{k^2}$		+ c. + c. + c. + c. + c.)		) k <sup>2</sup> ) 0	$^{2}W_{s}^{\parallel}\dagger^{\alpha\beta\chi}$	0		0	0	0		0	4 a. 0		
	<sup>0</sup>			0 0	0 0			0			$-\frac{a}{2}$													