

PSALTer results panel

[illegible]

Wave operator

$0^+ \mathcal{M}$	$0^+ f$	$0^+ \mathcal{M}$										
$0^+ \mathcal{M} \uparrow$	$\frac{\alpha}{2} + \beta_2 + (\alpha_4 + \alpha_6) k^2 \frac{i(\alpha_0 + 2\beta_1)k}{\sqrt{2}}$	0	0	$1^+ \mathcal{M}_{ab}$	$1^+ \mathcal{M}_{ab}$	$1^+ f_{ab}$	$1^+ \mathcal{M}_a$	$1^+ \mathcal{M}_a$	$1^+ f_a$	$1^+ f_a$		
$0^+ f \uparrow$	$\frac{i(\alpha_0 + 2\beta_1)k}{\sqrt{2}}$	$2\beta_2 k^2$	0									
$0^+ f \uparrow$	0	0	0									
$0^+ \mathcal{M} \uparrow$	0	0	$\frac{\alpha}{2} + 4\beta_3 + (\alpha_2 + \alpha_3) k^2$									
$1^+ \mathcal{M} \uparrow^{ab}$	$\frac{\alpha}{4} + \frac{1}{3}(\beta_1 + 8\beta_3) + (\alpha_2 + \alpha_5) k^2 \frac{3\alpha_0 - 4\beta_1 + 16\beta_3}{6\sqrt{2}}$	$\frac{i(3\alpha_0 - 4\beta_1 + 16\beta_3)k}{6\sqrt{2}}$	0	0	0	0						
$1^+ \mathcal{M} \uparrow^{ab}$	$\frac{3\alpha_0 - 4\beta_1 + 16\beta_3}{6\sqrt{2}}$	$\frac{2}{3}(\beta_1 + 2\beta_3)$	$\frac{2}{3}i(\beta_1 + 2\beta_3)k$									
$1^+ f \uparrow^{ab}$	$\frac{i(3\alpha_0 - 4\beta_1 + 16\beta_3)k}{6\sqrt{2}}$	$\frac{2}{3}i(\beta_1 + 2\beta_3)k$	$\frac{2}{3}(\beta_1 + 2\beta_3) k^2$									
$1^+ \mathcal{M} \uparrow^a$	0	0	0	$\frac{\alpha}{4} + \frac{1}{3}(\beta_1 + 2\beta_2) + (\alpha_4 + \alpha_5) k^2 \frac{3\alpha_0 - 4\beta_1 + 4\beta_2}{6\sqrt{2}}$	$\frac{1}{3}i(3\alpha_0 - 4\beta_1 + 4\beta_2)k$							
$1^+ \mathcal{M} \uparrow^a$	0	0	0	$\frac{3\alpha_0 - 4\beta_1 + 4\beta_2}{6\sqrt{2}}$	$\frac{1}{3}(2\beta_1 + \beta_2)$	$\frac{1}{3}i\sqrt{2}(2\beta_1 + \beta_2)k$						
$1^+ f \uparrow^a$	0	0	0	0	0	0						
$1^+ f \uparrow^a$	0	0	0	$\frac{1}{6}i(3\alpha_0 - 4\beta_1 + 4\beta_2)k$	$\frac{1}{3}i\sqrt{2}(2\beta_1 + \beta_2)k$	0	$\frac{2}{3}(2\beta_1 + \beta_2)k^2$	$2^+ \mathcal{M}_{ab}$	$2^+ f_{ab}$	$2^+ \mathcal{M}_{ab}$		
$2^+ \mathcal{M} \uparrow^{ab}$	$\frac{\alpha}{4} + \beta_1 + (\alpha_1 + \alpha_4) k^2 \frac{i(\alpha_0 - 4\beta_1)k}{2\sqrt{2}}$		0									
$2^+ f \uparrow^{ab}$	$\frac{i(\alpha_0 - 4\beta_1)k}{2\sqrt{2}}$	$2\beta_1 k^2$										
$2^+ \mathcal{M} \uparrow^{ab}$	0	0	$\frac{\alpha}{4} + \beta_1 + (\alpha_1 + \alpha_4) k^2$									

Saturated propagator

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Source constraints

Spin-parity form	Covariant form	Multiplicities
$0^+ 1^+ \equiv 0$	$\partial_\rho \partial_\sigma \tau (\Delta + \mathcal{K})^{\rho\sigma} \equiv 0$	1
$0^+ 1^+ \equiv 0$	$\partial_\rho \partial_\sigma \tau (\Delta + \mathcal{K})^{\rho\sigma} \equiv 0$	1
$2 1 k : 1^+ \sigma^a : 1^+ \tau^a \equiv 0$	$\partial_\rho \partial_\sigma \partial^a \tau (\Delta + \mathcal{K})^{\rho\sigma} \equiv \partial_\rho \partial^a \partial_\sigma \tau (\Delta + \mathcal{K})^{\rho\sigma} + 2 \partial_\rho \partial^a \partial_\sigma \partial_\sigma \tau$	3
$1^+ 1^0 \equiv 0$	$\partial_\rho \partial_\sigma \partial^a \tau (\Delta + \mathcal{K})^{\rho\sigma} \equiv \partial_\rho \partial^a \partial_\sigma \tau (\Delta + \mathcal{K})^{\rho\sigma}$	3
$1 k : 1^+ \sigma^a : 1^+ \tau^a \equiv 0$	$\partial_\rho \partial^a \partial_\sigma \tau (\Delta + \mathcal{K})^{\rho\sigma} + \partial_\rho \partial_\sigma \partial^a \tau (\Delta + \mathcal{K})^{\rho\sigma} + 2 \partial_\rho \partial_\sigma \partial^a \partial_\sigma \tau$	3
Total expected gauge generators:		
		11

Massive spectrum

Massive particle	Massive particle
Pole residue: $\frac{1}{a_2} \frac{a_1 + a_2 + 2\beta_1}{2(a_1\beta_1 + 2a_2\beta_2)} > 0$	Pole residue: $-\frac{1}{a_2 + \beta_3} > 0$
Square mass: $\frac{a_1(a_1 + 2\beta_1)}{4(a_1 + a_2)\beta_1} > 0$	Square mass: $\frac{a_1 + 8\beta_3}{2(a_2 + a_3)} > 0$
Spin: 0	Spin: 0
Parity: Even	Parity: Odd

	Massive particle		Massive particle
Pole residue:	$\left\{ (3(\alpha_0^2(3\alpha_2 + 3\alpha_5 + 2\beta_1 + 4\beta_3) - 8\alpha_0(\beta_2^2 + \alpha_5(\beta_1 - 4\beta_3) + \alpha_5(\beta_1 - 4\beta_3) - 4\beta_3^2) + 16(4\beta_1\beta_3(\beta_1 + 2\beta_3) + \alpha_5(\beta_2^2 + 8\beta_3^2))))/(2(\alpha_2 + \alpha_5)(\beta_1 + 2\beta_3)(3\alpha_0^2 - 12\alpha_0(\beta_1 - 2\beta_3) + 16(\alpha_5\beta_1 + 2\alpha_5\beta_3 - 6\beta_1\beta_3 + \alpha_2(\beta_1 + 2\beta_3)))) \right\} > 0$	Pole residue:	$\left\{ (3(\alpha_0^2(3\alpha_4 + 3\alpha_7 + 4\beta_1 + 2\beta_2) + 4\alpha_0(-2\alpha_4\beta_1 - 2\alpha_5\beta_1 - 4\beta_2^2 + 2\alpha_4\beta_2 + 2\alpha_5\beta_2 + \beta_2^2) + 8(-2\beta_1\beta_2(2\beta_1 + \beta_2) + \alpha_4(2\beta_1^2 + \beta_2^2) + \alpha_5(2\beta_1^2 + \beta_2^2))))/(2(\alpha_4 + \alpha_5)(2\beta_1 + \beta_2)(3\alpha_0^2 + 6\alpha_0(-2\beta_1 + \beta_2) + 4(2\alpha_5\beta_1 + \alpha_5\beta_2 - 6\beta_1\beta_2 + \alpha_4(2\beta_1 + \beta_2)))) \right\} > 0$
Square mass:	$\frac{3(\alpha_2 - 4\beta_1)(\alpha_2 + 8\beta_3)}{16(\alpha_2 + \alpha_5)(\beta_1 + 2\beta_3)} > 0$	Square mass:	$\frac{3(\alpha_4 - \beta_1)(\alpha_4 + 2\beta_2)}{8(\alpha_4 + \alpha_5)(2\beta_1 + \beta_2)} > 0$
Spin:	1	Spin:	1
Parity:	Even	Parity:	Odd

Massive particle	Massive particle
Pole residue: $\frac{2}{a_i} - \frac{a_i + a_i + 2\beta_i}{2a_i\beta_i + 2a_i\beta_i} > 0$	Pole residue: $-\frac{1}{a_i + a_i} > 0$
Square mass: $\frac{a_i(a_i - 4\beta_i)}{16(a_i + a_i)\beta_i} > 0$	Square mass: $\frac{a_i - 4\beta_i}{4(a_i + a_i)} > 0$
Spin: 2	Spin: 2
Parity: Even	Parity: Odd

Massless spectrum

Massless particle
Pole residue: $\left \frac{z^2}{q} \right > 0$
Polarisations: 2

Unitarity conditions