

[illegible][illegible][illegible]

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

<div>Massive particle</div> <table> <tr> <td>Pole residue:</td><td><math>\frac{1}{a_0} + \frac{a_1+a_2+2\beta_1}{2a_1\beta_1+2a_2\beta_2} &gt; 0</math></td></tr> <tr> <td>Square mass:</td><td><math>\frac{a_1(a_1+2\beta_1)}{4(a_1+a_2)\beta_1} &gt; 0</math></td></tr> <tr> <td>Spin:</td><td>0</td></tr> <tr> <td>Parity:</td><td>Even</td></tr> </table>	Pole residue:	$\frac{1}{a_0} + \frac{a_1+a_2+2\beta_1}{2a_1\beta_1+2a_2\beta_2} > 0$	Square mass:	$\frac{a_1(a_1+2\beta_1)}{4(a_1+a_2)\beta_1} > 0$	Spin:	0	Parity:	Even	<div>Massive particle</div> <table> <tr> <td>Pole residue:</td><td><math>\frac{1}{a_1+a_2} &gt; 0</math></td></tr> <tr> <td>Square mass:</td><td><math>\frac{a_1+8\beta_1}{2(a_1+a_2)} &gt; 0</math></td></tr> <tr> <td>Spin:</td><td>0</td></tr> <tr> <td>Parity:</td><td>Odd</td></tr> </table>	Pole residue:	$\frac{1}{a_1+a_2} > 0$	Square mass:	$\frac{a_1+8\beta_1}{2(a_1+a_2)} > 0$	Spin:	0	Parity:	Odd
Pole residue:	$\frac{1}{a_0} + \frac{a_1+a_2+2\beta_1}{2a_1\beta_1+2a_2\beta_2} > 0$																
Square mass:	$\frac{a_1(a_1+2\beta_1)}{4(a_1+a_2)\beta_1} > 0$																
Spin:	0																
Parity:	Even																
Pole residue:	$\frac{1}{a_1+a_2} > 0$																
Square mass:	$\frac{a_1+8\beta_1}{2(a_1+a_2)} > 0$																
Spin:	0																
Parity:	Odd																
<div>Massive particle</div> <table> <tr> <td>Pole residue:</td><td><math display="block">\frac{(3(\alpha_1^2(3\alpha_2+3\alpha_5+2\beta_1+4\beta_3)-8\alpha_0(\beta_1^2+\alpha_2(\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_2(\beta_1^2+8\beta_3^2)+\alpha_5(\beta_1^2+8\beta_3^2))))/(2(\alpha_1+\alpha_2)(\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))))&gt;0}{}</math></td></tr> <tr> <td>Square mass:</td><td><math>\frac{3(a_0-4\beta_1)(a_0+8\beta_1)}{16(a_1+a_2)(\beta_1+2\beta_3)} &gt; 0</math></td></tr> <tr> <td>Spin:</td><td>1</td></tr> <tr> <td>Parity:</td><td>Even</td></tr> </table>	Pole residue:	$\frac{(3(\alpha_1^2(3\alpha_2+3\alpha_5+2\beta_1+4\beta_3)-8\alpha_0(\beta_1^2+\alpha_2(\beta_1-4\beta_3)+\alpha_5(\beta_1-4\beta_3)-4\beta_3^2)+16(-4\beta_1\beta_3(\beta_1+2\beta_3)+\alpha_2(\beta_1^2+8\beta_3^2)+\alpha_5(\beta_1^2+8\beta_3^2))))/(2(\alpha_1+\alpha_2)(\beta_1+2\beta_3)(3\alpha_0^2-12\alpha_0(\beta_1-2\beta_3)+16(\alpha_5\beta_1+2\alpha_5\beta_3-6\beta_1\beta_3+\alpha_2(\beta_1+2\beta_3))))>0}{}$	Square mass:	$\frac{3(a_0-4\beta_1)(a_0+8\beta_1)}{16(a_1+a_2)(\beta_1+2\beta_3)} > 0$	Spin:	1	Parity:	Even	<div>Massive particle</div> <table> <tr> <td>Pole residue:</td><td><math display="block">\frac{-((3(\alpha_1^2(3\alpha_4+3\alpha_5+4\beta_1+2\beta_2)+4\alpha_0(-2\alpha_1\beta_1-2\alpha_5\beta_1-4\beta_1^2+2\alpha_2\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_1+\alpha_2)(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))))&gt;0}{}</math></td></tr> <tr> <td>Square mass:</td><td><math>\frac{3(a_0-4\beta_1)(a_0+2\beta_2)}{8(a_1+a_2)(2\beta_1+\beta_2)} &gt; 0</math></td></tr> <tr> <td>Spin:</td><td>1</td></tr> <tr> <td>Parity:</td><td>Odd</td></tr> </table>	Pole residue:	$\frac{-((3(\alpha_1^2(3\alpha_4+3\alpha_5+4\beta_1+2\beta_2)+4\alpha_0(-2\alpha_1\beta_1-2\alpha_5\beta_1-4\beta_1^2+2\alpha_2\beta_2+2\alpha_5\beta_2+\beta_2^2)+8(-2\beta_1\beta_2(2\beta_1+\beta_2)+\alpha_4(2\beta_1^2+\beta_2^2)+\alpha_5(2\beta_1^2+\beta_2^2))))/(2(\alpha_1+\alpha_2)(2\beta_1+\beta_2)(3\alpha_0^2+6\alpha_0(-2\beta_1+\beta_2)+4(2\alpha_5\beta_1+\alpha_5\beta_2-6\beta_1\beta_2+\alpha_4(2\beta_1+\beta_2))))>0}{}$	Square mass:	$\frac{3(a_0-4\beta_1)(a_0+2\beta_2)}{8(a_1+a_2)(2\beta_1+\beta_2)} > 0$	Spin:	1	Parity:	Odd
Pole residue:	$\frac{(3(\alpha_1^2(3\alpha_2+3\alpha_5+2\beta_1+4\beta_3)-8\alpha_0(\beta_1^2+\alpha_2(\beta_1-4\beta_3)+\alpha_5(\beta_1-4\beta_3)-4\beta_3^2)+16(-4\beta_1\beta_3(\beta_1+2\beta_3)+\alpha_2(\beta_1^2+8\beta_3^2)+\alpha_5(\beta_1^2+8\beta_3^2))))/(2(\alpha_1+\alpha_2)(\beta_1+2\beta_3)(3\alpha_0^2-12\alpha_0(\beta_1-2\beta_3)+16(\alpha_5\beta_1+2\alpha_5\beta_3-6\beta_1\beta_3+\alpha_2(\beta_1+2\beta_3))))>0}{}$																
Square mass:	$\frac{3(a_0-4\beta_1)(a_0+8\beta_1)}{16(a_1+a_2)(\beta_1+2\beta_3)} > 0$																
Spin:	1																
Parity:	Even																
Pole residue:	$\frac{-((3(\alpha_1^2(3\alpha_4+3\alpha_5+4\beta_1+2\beta_2)+4\alpha_0(-2\alpha_1\beta_1-2\alpha_5\beta_1-4\beta_1^2+2\alpha_2\beta_2+2\alpha_5\beta_2+\beta_2^2)+8(-2\beta_1\beta_2(2\beta_1+\beta_2)+\alpha_4(2\beta_1^2+\beta_2^2)+\alpha_5(2\beta_1^2+\beta_2^2))))/(2(\alpha_1+\alpha_2)(2\beta_1+\beta_2)(3\alpha_0^2+6\alpha_0(-2\beta_1+\beta_2)+4(2\alpha_5\beta_1+\alpha_5\beta_2-6\beta_1\beta_2+\alpha_4(2\beta_1+\beta_2))))>0}{}$																
Square mass:	$\frac{3(a_0-4\beta_1)(a_0+2\beta_2)}{8(a_1+a_2)(2\beta_1+\beta_2)} > 0$																
Spin:	1																
Parity:	Odd																

Massive particle

Pole residue:	$-\frac{2}{a_1} \frac{a_1 + a_2 + 2\beta_1}{2a_1\beta_1 + 2a_2\beta_1}$	$> 0$
Square mass:	$\frac{a_1(a_1 - 4\beta_1)}{16(a_1 + a_2)\beta_1}$	$> 0$
Spin:	2	
Parity:	Even	

Massive particle

Pole residue:	$\frac{1}{a_1 + a_2}$	$> 0$
Square mass:	$\frac{a_1 - 4\beta_1}{4(a_1 + a_2)\beta_1}$	$> 0$
Spin:	2	
Parity:	Odd	

**Massless spectrum**

Massless particle

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

Massless particle

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