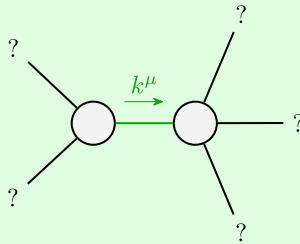


Massive particle	
Pole residue:	$-\frac{1}{\alpha_3} > 0$
Polarisations:	1
Square mass:	$-\frac{\alpha_0-4\beta_1}{2\alpha_3} > 0$
Spin:	0
Parity:	Odd



Quadratic pole	
Pole residue:	$\frac{1}{\alpha_0} > 0$
Polarisations:	2

Unitarity conditions

$$\alpha_0 > 0 \ \&\& \ \alpha_3 < 0 \ \&\& \ \beta_1 < \frac{\alpha_0}{4}$$

$\sigma_{1+}^{\#1} \uparrow^{\alpha\beta}$	$\sigma_{1+}^{\#2} \alpha\beta$	$\tau_{1+}^{\#1} \alpha\beta$	$\sigma_{1-}^{\#1} \alpha$	$\sigma_{1-}^{\#2} \alpha$	$\tau_{1-}^{\#2} \alpha$
0	$\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)}$	$\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)}$	0	0	0
$\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)}$	$-\frac{2}{(\alpha_0-4\beta_1)(1+k^2)^2}$	$-\frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2}$	0	0	0
$-\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)}$	$\frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2}$	$-\frac{2k^2}{(\alpha_0-4\beta_1)(1+k^2)^2}$	0	0	0
0	0	0	0	$-\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)}$	$-\frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)}$
0	0	0	$-\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)}$	$-\frac{2}{(\alpha_0-4\beta_1)(1+2k^2)^2}$	$-\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2}$
0	0	0	0	0	0
0	0	0	$\frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)}$	$\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2}$	$-\frac{4k^2}{(\alpha_0-4\beta_1)(1+2k^2)^2}$

$\omega_{1+}^{\#1} \uparrow^{\alpha\beta}$	$\omega_{1+}^{\#2} \alpha\beta$	$f_{1+}^{\#1} \alpha\beta$	$\omega_{1-}^{\#1} \alpha$	$\omega_{1-}^{\#2} \alpha$	$f_{1-}^{\#2} \alpha$
$\frac{1}{4}(\alpha_0-4\beta_1)$	$\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	$\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0	0	0
$\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	0	0	0	0	0
$-\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0	0	0	0	0
0	0	0	$\frac{1}{4}(\alpha_0-4\beta_1)$	$-\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	$-\frac{1}{2}i(\alpha_0-4\beta_1)k$
0	0	0	$-\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	0	0
0	0	0	0	0	0
0	0	0	$\frac{1}{2}i(\alpha_0-4\beta_1)k$	0	0

$\omega_{0+}^{\#1}$	$f_{0+}^{\#1}$	$f_{0+}^{\#2}$	$\omega_{0-}^{\#1}$
$\frac{1}{2}(\alpha_0-4\beta_1)$	$-\frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}}$	0	0
$\frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}}$	$-4\beta_1k^2$	0	0
0	0	0	0
0	0	0	$\frac{\alpha_0-2\beta_1+\alpha_3k^2}{2}$

Lagrangian density

$$\begin{aligned}
 & -\frac{1}{2}\alpha_0\omega_{\alpha\chi\beta}\omega^{\alpha\beta\chi}-\frac{1}{2}\alpha_0\omega^{\alpha\beta}{}_{\alpha}\omega^{\chi}{}_{\beta}\omega^{\chi}{}_{\alpha}+2\beta_1\omega^{\alpha\beta}{}_{\alpha}\omega^{\chi\delta}{}_{\chi}\omega^{\chi\delta}{}_{\alpha}+ \\
 & f^{\alpha\beta}{}_{\alpha}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}{}_{\alpha}\sigma_{\alpha\beta\chi}-2\beta_1\omega^{\chi}{}_{\alpha}\omega^{\alpha\beta}{}_{\chi}\partial_{\beta}f^{\alpha\beta}{}_{\alpha}-2\beta_1\omega^{\delta}{}_{\alpha}\partial_{\delta}f^{\alpha\beta}{}_{\alpha}-\alpha_0f^{\alpha\beta}{}_{\alpha}\partial_{\beta}\omega^{\chi}{}_{\alpha}+ \\
 & \alpha_0\partial_{\beta}\omega^{\alpha\beta}{}_{\alpha}+\frac{2}{3}\alpha_3\partial^{\alpha}\omega^{\beta\zeta}{}_{\chi}\partial_{\beta}\omega^{\chi\alpha}{}_{\zeta}+2\beta_1\omega^{\chi}{}_{\alpha}\partial^{\beta}f^{\alpha}{}_{\alpha}+2\beta_1\omega^{\delta}{}_{\beta}\partial^{\beta}f^{\alpha}{}_{\alpha}- \\
 & 2\beta_1\partial_{\beta}f^{\chi}{}_{\alpha}\partial^{\beta}f^{\alpha}{}_{\chi}+\alpha_0f^{\alpha\beta}{}_{\alpha}\partial_{\chi}\omega^{\chi}{}_{\beta}-\alpha_0f^{\alpha}{}_{\alpha}\partial_{\chi}\omega^{\beta\chi}{}_{\beta}-\frac{2}{3}\alpha_3\partial_{\beta}\omega^{\zeta\alpha}{}_{\zeta}\partial_{\alpha}\omega^{\beta\zeta}{}_{\alpha}- \\
 & \frac{1}{3}\alpha_3\partial_{\beta}\omega^{\chi}{}_{\alpha}\partial_{\chi}\omega^{\zeta\alpha\beta}{}_{\beta}+4\beta_1\omega_{\alpha\chi\beta}\partial^{\chi}f^{\alpha\beta}{}_{\beta}+\beta_1\partial_{\chi}f^{\delta}{}_{\beta}\partial^{\chi}f^{\beta}{}_{\delta}+ \\
 & \frac{2}{3}\alpha_3\partial_{\chi}\omega^{\beta\zeta\alpha}{}_{\alpha}\partial^{\chi}\omega_{\zeta\alpha\beta}{}_{\beta}+\frac{1}{3}\alpha_3\partial_{\chi}\omega^{\zeta\alpha\beta}{}_{\alpha}\partial^{\chi}\omega_{\zeta\alpha\beta}{}_{\beta}+4\beta_1\partial^{\beta}f^{\alpha}{}_{\alpha}\partial_{\delta}f^{\delta}{}_{\beta}- \\
 & 2\beta_1\partial_{\beta}f^{\beta}{}_{\chi}\partial_{\delta}f^{\chi\delta}{}_{\alpha}+\frac{2}{3}\alpha_3\partial^{\beta}\omega^{\delta\zeta}{}_{\alpha}\partial_{\delta}\omega^{\alpha}{}_{\zeta}-\frac{2}{3}\alpha_3\partial^{\beta}\omega^{\zeta\delta}{}_{\alpha}\partial_{\delta}\omega^{\alpha}{}_{\zeta}- \\
 & \beta_1\partial^{\chi}f^{\beta}{}_{\zeta}\partial^{\zeta}f^{\beta}{}_{\chi}-\beta_1\partial^{\chi}f^{\beta}{}_{\zeta}\partial^{\zeta}f^{\chi}{}_{\beta}+\beta_1\partial^{\chi}f^{\beta}{}_{\delta}\partial^{\delta}f^{\chi}{}_{\beta}-\beta_1\partial^{\chi}f^{\zeta\delta}{}_{\alpha}\partial^{\delta}f^{\alpha}{}_{\zeta}
 \end{aligned}$$

Source constraints

SO(3) irreps	#
$\tau_{0+}^{\#2} == 0$	1
$\tau_{1-}^{\#2\alpha} + 2ik\sigma_{1-}^{\#2\alpha} == 0$	3
$\tau_{1-}^{\#1\alpha} == 0$	3
$\tau_{1+}^{\#1\alpha\beta} + ik\sigma_{1+}^{\#2\alpha\beta} == 0$	3
Total #:	10

	$\omega_{2+}^{\#1} \alpha\beta$	$f_{2+}^{\#1} \alpha\beta$	$\omega_{2-}^{\#1} \alpha\beta\chi$
$\omega_{2+}^{\#1} \uparrow^{\alpha\beta}$	$-\frac{\alpha_0}{4} + \beta_1$	$\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0
$f_{2+}^{\#1} \uparrow^{\alpha\beta}$	$-\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	$2\beta_1k^2$	0
$\omega_{2-}^{\#1} \uparrow^{\alpha\beta\chi}$	0	0	$-\frac{\alpha_0}{4} + \beta_1$

	$\sigma_{2+}^{\#1} \alpha\beta$	$\tau_{2+}^{\#1} \alpha\beta$	$\sigma_{2-}^{\#1} \alpha\beta\chi$
$\sigma_{2+}^{\#1} \uparrow^{\alpha\beta}$	$-\frac{16\beta_1}{\alpha_0^2-4\alpha_0\beta_1}$	$\frac{2i\sqrt{2}}{\alpha_0k}$	0
$\tau_{2+}^{\#1} \uparrow^{\alpha\beta}$	$-\frac{2i\sqrt{2}}{\alpha_0k}$	$\frac{2}{\alpha_0k^2}$	0
$\sigma_{2-}^{\#1} \uparrow^{\alpha\beta\chi}$	0	0	$\frac{1}{-\frac{\alpha_0}{4} + \beta_1}$

	$\sigma_{0+}^{\#1}$	$\tau_{0+}^{\#1}$	$\tau_{0+}^{\#2}$	$\sigma_{0-}^{\#1}$
$\sigma_{0+}^{\#1} \uparrow$	$\frac{8\beta_1}{\alpha_0^2-4\alpha_0\beta_1}$	$-\frac{i\sqrt{2}}{\alpha_0k}$	0	0
$\tau_{0+}^{\#1} \uparrow$	$\frac{i\sqrt{2}}{\alpha_0k}$	$-\frac{1}{\alpha_0k^2}$	0	0
$\tau_{0+}^{\#2} \uparrow$	0	0	0	0
$\sigma_{0-}^{\#1} \uparrow$	0	0	0	$\frac{2}{\alpha_0-4\beta_1+2\alpha_3k^2}$