

Quadratic pole

Pole residue: $-\frac{1}{a_0} > 0$

Polarisations: 2

$$a_0 > 0$$

Unitarity conditions

(No massive particles)

$\Delta_1^{\#1} \dagger^{\alpha\beta}$	$\Delta_1^{\#2} \dagger^{\alpha\beta}$	$\Delta_1^{\#3} \dagger^{\alpha\beta}$	$\Delta_1^{\#1} \dagger^{\alpha}$	$\Delta_1^{\#2} \dagger^{\alpha}$	$\Delta_1^{\#3} \dagger^{\alpha}$	$\Delta_1^{\#4} \dagger^{\alpha}$	$\Delta_1^{\#5} \dagger^{\alpha}$	$\Delta_1^{\#6} \dagger^{\alpha}$	$\mathcal{T}_1^{\#1} \dagger^{\alpha}$
0	$-\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0	0	0	0
$\Delta_1^{\#2} \dagger^{\alpha\beta}$	$-\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0	0	0	0
$\Delta_1^{\#3} \dagger^{\alpha\beta}$	0	$\frac{4}{a_0}$	0	0	0	0	0	0	0
$\Delta_1^{\#1} \dagger^{\alpha}$	0	0	0	$\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0
$\Delta_1^{\#2} \dagger^{\alpha}$	0	0	$\frac{2\sqrt{2}}{a_0}$	0	0	0	0	0	0
$\Delta_1^{\#3} \dagger^{\alpha}$	0	0	0	0	$-\frac{19}{12a_0}$	$\frac{5\sqrt{5}}{12a_0}$	$-\frac{1}{6\sqrt{2}a_0}$	$-\frac{1}{6a_0}$	0
$\Delta_1^{\#4} \dagger^{\alpha}$	0	0	0	0	$\frac{5\sqrt{5}}{12a_0}$	$-\frac{1}{12a_0}$	$-\frac{\sqrt{5}}{6a_0}$	$-\frac{\sqrt{5}}{6a_0}$	0
$\Delta_1^{\#5} \dagger^{\alpha}$	0	0	0	0	$-\frac{1}{6\sqrt{2}a_0}$	$-\frac{\sqrt{5}}{6a_0}$	$-\frac{17}{6a_0}$	$-\frac{7}{3\sqrt{2}a_0}$	0
$\Delta_1^{\#6} \dagger^{\alpha}$	0	0	0	0	$-\frac{1}{6a_0}$	$-\frac{\sqrt{5}}{6a_0}$	$-\frac{7}{3\sqrt{2}a_0}$	$-\frac{5}{3a_0}$	0
$\mathcal{T}_1^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0	0	0

$\Gamma_1^{\#1} \dagger^{\alpha\beta}$	$\Gamma_1^{\#2} \dagger^{\alpha\beta}$	$\Gamma_1^{\#3} \dagger^{\alpha\beta}$	$\Gamma_1^{\#1} \dagger^{\alpha}$	$\Gamma_1^{\#2} \dagger^{\alpha}$	$\Gamma_1^{\#3} \dagger^{\alpha}$	$\Gamma_1^{\#4} \dagger^{\alpha}$	$\Gamma_1^{\#5} \dagger^{\alpha}$	$\Gamma_1^{\#6} \dagger^{\alpha}$	$h_1^{\#1} \dagger^{\alpha}$
$\Gamma_1^{\#1} \dagger^{\alpha\beta}$	$-\frac{a_0}{4}$	0	0	0	0	0	0	0	0
$\Gamma_1^{\#2} \dagger^{\alpha\beta}$	$-\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0	0	0
$\Gamma_1^{\#3} \dagger^{\alpha\beta}$	0	$\frac{a_0}{4}$	0	0	0	0	0	0	0
$\Gamma_1^{\#1} \dagger^{\alpha}$	0	0	$-\frac{a_0}{4}$	$\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0
$\Gamma_1^{\#2} \dagger^{\alpha}$	0	0	$\frac{a_0}{2\sqrt{2}}$	0	0	0	0	0	0
$\Gamma_1^{\#3} \dagger^{\alpha}$	0	0	0	0	$-\frac{a_0}{3}$	$\frac{\sqrt{5}a_0}{6}$	$-\frac{a_0}{6\sqrt{2}}$	$-\frac{a_0}{6}$	0
$\Gamma_1^{\#4} \dagger^{\alpha}$	0	0	0	0	$\frac{\sqrt{5}a_0}{6}$	$\frac{a_0}{3}$	$-\frac{1}{6}\sqrt{\frac{5}{2}}a_0$	$-\frac{\sqrt{5}a_0}{6}$	0
$\Gamma_1^{\#5} \dagger^{\alpha}$	0	0	0	0	$-\frac{a_0}{6\sqrt{2}}$	$-\frac{1}{6}\sqrt{\frac{5}{2}}a_0$	$\frac{a_0}{3}$	$\frac{a_0}{6\sqrt{2}}$	0
$\Gamma_1^{\#6} \dagger^{\alpha}$	0	0	0	0	$-\frac{a_0}{6}$	$-\frac{\sqrt{5}a_0}{6}$	$\frac{a_0}{6\sqrt{2}}$	$\frac{5a_0}{12}$	0
$h_1^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0	0	0

Lagrangian density

$$\begin{aligned}
&-\frac{1}{2}a_0\,\Gamma^{\alpha\beta\chi}_\beta\Gamma_{\chi\alpha}+\frac{1}{2}a_0\,\Gamma^\alpha_\alpha\,\Gamma^\beta_\beta\,\Gamma^\chi_\chi-\\
&\frac{1}{2}a_0\,\Gamma^{\alpha\beta\chi}_\beta\partial_\beta h_{\alpha\chi}-\frac{1}{4}a_0\,\Gamma^\alpha_\alpha\,\Gamma^\beta_\beta\,\partial_\beta h^{\chi\chi}_\chi+\frac{1}{4}a_0\,\Gamma^{\alpha\beta}_\alpha\,\Gamma^\chi_\chi\,\partial_\beta h^{\chi\chi}_\chi-\\
&\frac{1}{4}a_0\,h^{\chi\chi}_\chi\,\partial_\beta\Gamma^\alpha_\alpha\,\beta+\frac{1}{4}a_0\,h^{\chi\chi}_\chi\,\partial_\beta\Gamma^{\alpha\beta}_\alpha-\frac{1}{2}a_0\,h_{\alpha\chi}\,\partial_\beta\Gamma^{\alpha\beta\chi}_\alpha+\\
&\frac{1}{2}a_0\,h^{\alpha\beta}_\alpha\partial_\beta\partial_\alpha h^{\chi\chi}_\chi-\frac{1}{8}a_0\partial_\beta h^{\chi\chi}_\chi\,\partial^\beta h^\alpha_\alpha+\frac{1}{2}a_0\,\Gamma^\alpha_\alpha\,\beta\,\partial_\chi h^\beta_\beta-\\
&\frac{1}{2}a_0\partial_\alpha h^{\alpha\beta}_\alpha\partial_\chi h^\chi_\beta{}^\chi+\frac{1}{2}a_0\partial^\beta h^\alpha_\alpha\partial_\chi h^\chi_\beta{}^\chi-a_0\,h^{\alpha\beta}_\alpha\partial_\chi\partial_\beta h^{\chi\chi}_\alpha+\\
&\frac{1}{4}a_0\,h^\alpha_\alpha\partial_\chi\partial_\beta h^{\beta\chi}_\chi+\frac{1}{2}a_0\,h^{\alpha\beta}_\alpha\partial_\chi\partial^\chi h_{\alpha\beta}-\frac{1}{4}a_0\,h^\alpha_\alpha\partial_\chi\partial^\chi h^\beta_\beta-\\
&\frac{1}{4}a_0\partial_\beta h_{\alpha\chi}\partial^\chi h^{\alpha\beta}_\alpha+\frac{3}{8}a_0\partial_\chi h_{\alpha\beta}\partial^\chi h^{\alpha\beta}_\alpha+\frac{1}{2}a_0\,h_{\beta\chi}\partial^\chi\Gamma^{\alpha\beta}_\alpha
\end{aligned}$$

Added source term: $|h^{\alpha\beta}\mathcal{T}_{\alpha\beta}+\Gamma^{\alpha\beta\chi}\Delta_{\alpha\beta\chi}$

$\Delta_0^{\#1} \dagger$	$\Delta_0^{\#2} \dagger$	$\Delta_0^{\#3} \dagger$	$\Delta_0^{\#4} \dagger$	$\mathcal{T}_0^{\#1} \dagger$	$\mathcal{T}_0^{\#2} \dagger$	$\Delta_0^{\#1-} \dagger$
$\Delta_0^{\#1} \dagger$	$-\frac{2}{a_0}$	0	0	0	0	0
$\Delta_0^{\#2} \dagger$	0	$-\frac{3}{4a_0}$	$-\frac{1}{2\sqrt{2}a_0}$	0	0	0
$\Delta_0^{\#3} \dagger$	0	$\frac{5}{4a_0}$	$-\frac{3}{4a_0}$	0	0	0
$\Delta_0^{\#4} \dagger$	0	$-\frac{1}{2\sqrt{2}a_0}$	$-\frac{1}{2\sqrt{2}a_0}$	0	0	0
$\mathcal{T}_0^{\#1} \dagger$	0	0	0	$\frac{4}{a_0k^2}$	0	0
$\mathcal{T}_0^{\#2} \dagger$	0	0	0	0	0	0
$\Delta_0^{\#1-} \dagger$	0	0	0	0	0	$-\frac{2}{a_0}$

$$\Delta_3^{\#1} \dagger^{\alpha\beta\chi} \quad \Delta_3^{\#1} \dagger^{\alpha\beta\chi} \quad \boxed{-\frac{2}{a_0}}$$

$$\Gamma_3^{\#1} \dagger^{\alpha\beta\chi} \quad \Gamma_3^{\#1} \dagger^{\alpha\beta\chi} \quad \boxed{-\frac{a_0}{2}}$$

$\Delta_2^{\#1} \dagger^{\alpha\beta}$	$\Delta_2^{\#2} \dagger^{\alpha\beta}$	$\Delta_2^{\#3} \dagger^{\alpha\beta}$	$\mathcal{T}_2^{\#1} \dagger^{\alpha\beta}$	$\Delta_2^{\#1} \dagger^{\alpha\beta}$	$\Delta_2^{\#2} \dagger^{\alpha\beta\chi}$
$\Delta_2^{\#1} \dagger^{\alpha\beta}$	$\frac{4}{a_0}$	0	0	0	0
$\Delta_2^{\#2} \dagger^{\alpha\beta}$	0	$-\frac{2}{a_0}$	0	0	0
$\Delta_2^{\#3} \dagger^{\alpha\beta}$	0	0	$\frac{4}{a_0}$	0	0
$\mathcal{T}_2^{\#1} \dagger^{\alpha\beta}$	0	0	$-\frac{8}{a_0k^2}$	0	0
$\Delta_2^{\#1} \dagger^{\alpha\beta\chi}$	0	0	0	$\frac{4}{a_0}$	0
$\Delta_2^{\#2} \dagger^{\alpha\beta\chi}$	0	0	0	0	$\frac{4}{a_0}$

$\Gamma_2^{\#1} \dagger^{\alpha\beta\chi}$	$\Gamma_2^{\#2} \dagger^{\alpha\beta\chi}$	$\Gamma_2^{\#1} \dagger^{\alpha\beta}$	$\Gamma_2^{\#2} \dagger^{\alpha\beta}$	$\Gamma_2^{\#3} \dagger^{\alpha\beta}$	$h_2^{\#1} \dagger^{\alpha\beta}$	$\Gamma_2^{\#1} \dagger^{\alpha\beta\chi}$	$\Gamma_2^{\#2} \dagger^{\alpha\beta\chi}$
$\Gamma_2^{\#1} \dagger^{\alpha\beta\chi}$	0	0	0	0	0	0	0
$\Gamma_2^{\#2} \dagger^{\alpha\beta\chi}$	0	0	0	0	0	0	0
$h_2^{\#1} \dagger^{\alpha\beta}$	0	0	0	0	$-\frac{a_0k^2}{8}$	0	0
$\Gamma_2^{\#1} \dagger^{\alpha\beta}$	0	0	0	$\frac{a_0}{4}$	0	0	0
$\Gamma_2^{\#2} \dagger^{\alpha\beta}$	0	0	0	0	0	0	0

$\Gamma_0^{\#1} \dagger$	$\Gamma_0^{\#2} \dagger$	$\Gamma_0^{\#3} \dagger$	$\Gamma_0^{\#4} \dagger$	$h_0^{\#1} \dagger$	$h_0^{\#2} \dagger$	$\Gamma_0^{\#1-} \dagger$
$\Gamma_0^{\#1} \dagger$	$-\frac{a_0}{2}$	0	0	0	0	0
$\Gamma_0^{\#2} \dagger$	0	0	$\frac{a_0}{2}$	$-\frac{a_0}{2\sqrt{2}}$	0	0
$\Gamma_0^{\#3} \dagger$	0	$\frac{a_0}{2}$	0	$-\frac{a_0}{2\sqrt{2}}$	0	0
$\Gamma_0^{\#4} \dagger$	0	$-\frac{a_0}{2\sqrt{2}}$	$-\frac{a_0}{2\sqrt{2}}$	$\frac{a_0}{2}$	0	0
$h_0^{\#1} \dagger$	0	0	0	0	$\frac{a_0k^2}{4}$	0
$h_0^{\#2} \dagger$	0	0	0	0	0	0
$\Gamma_0^{\#1-} \dagger$	0	0	0	0	0	$-\frac{a_0}{2}$

Source constraints

#	#
SO(3) irreps	1
$\mathcal{T}_0^{\#2} == 0$	1
$\Delta_0^{\#3} + 2\Delta_0^{\#4} + 3\Delta_0^{\#2} == 0$	3
$\mathcal{T}_1^{\#1\alpha} == 0$	2 $\Delta_1^{\#6\alpha} + \Delta_1^{\#4\alpha} + 2\Delta_1^{\#5\alpha} + \Delta_1^{\#3\alpha} == 0$
Total #:	8