

$$\begin{array}{c} \sigma_{0+}^{\#1} \quad \sigma_{0-}^{\#1} \\ \sigma_{0+}^{\#1} + \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \\ \sigma_{0-}^{\#1} + \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \end{array}$$

$$\begin{array}{c} \sigma_{2+}^{\#1} \alpha\beta \quad \sigma_{2-}^{\#1} \alpha\beta\chi \\ \sigma_{2+}^{\#1} + \alpha\beta \quad \begin{array}{|c|c|} \hline -\frac{2}{3k^2 r_3} & 0 \\ \hline \end{array} \\ \sigma_{2-}^{\#1} + \alpha\beta\chi \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \end{array}$$

$$\begin{array}{c} \omega_{0+}^{\#1} \quad \omega_{0-}^{\#1} \\ \omega_{0+}^{\#1} + \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \\ \omega_{0-}^{\#1} + \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \end{array}$$

$$\begin{array}{c} \sigma_{1+}^{\#1} + \alpha\beta \quad \sigma_{1+}^{\#2} \alpha\beta \quad \sigma_{1-}^{\#1} \alpha \quad \sigma_{1-}^{\#2} \alpha \\ \sigma_{1+}^{\#2} + \alpha\beta \quad \begin{array}{|c|c|c|c|} \hline \frac{1}{k^2(2r_3+r_5)} & 0 & 0 & 0 \\ \hline \end{array} \\ \sigma_{1-}^{\#1} + \alpha \quad \begin{array}{|c|c|c|c|} \hline 0 & 0 & \frac{k^2}{2(r_3+2r_5)} & 0 \\ \hline \end{array} \\ \sigma_{1-}^{\#2} + \alpha \quad \begin{array}{|c|c|c|c|} \hline 0 & 0 & 0 & 0 \\ \hline \end{array} \end{array}$$

$$\begin{array}{c} \omega_{2+}^{\#1} + \alpha\beta \quad \omega_{2-}^{\#1} \alpha\beta\chi \\ \omega_{2+}^{\#1} + \alpha\beta \quad \begin{array}{|c|c|} \hline -\frac{3k^2 r_3}{2} & 0 \\ \hline \end{array} \\ \omega_{2-}^{\#1} + \alpha\beta\chi \quad \begin{array}{|c|c|} \hline 0 & 0 \\ \hline \end{array} \end{array}$$

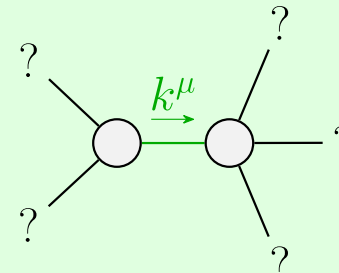
$$\begin{array}{c} \omega_{1+}^{\#1} + \alpha\beta \quad \omega_{1+}^{\#2} \alpha\beta \quad \omega_{1-}^{\#1} \alpha \quad \omega_{1-}^{\#2} \alpha \\ \omega_{1+}^{\#2} + \alpha\beta \quad \begin{array}{|c|c|c|c|} \hline k^2(2r_3+r_5) & 0 & 0 & 0 \\ \hline \end{array} \\ \omega_{1-}^{\#1} + \alpha \quad \begin{array}{|c|c|c|c|} \hline 0 & 0 & \frac{1}{2}k^2(r_3+2r_5) & 0 \\ \hline \end{array} \\ \omega_{1-}^{\#2} + \alpha \quad \begin{array}{|c|c|c|c|} \hline 0 & 0 & 0 & 0 \\ \hline \end{array} \end{array}$$

Source constraints	SO(3) irreps	#
$\sigma_0^{\#1} == 0$	$\sigma_0^{\#1} == 0$	1
$\sigma_1^{\#1} == 0$	$\sigma_1^{\#1} == 0$	1
$\sigma_1^{\#2\alpha} == 0$	$\sigma_1^{\#2\alpha} == 0$	3
$\sigma_1^{\#2\alpha\beta} == 0$	$\sigma_1^{\#2\alpha\beta} == 0$	3
$\sigma_2^{\#1\alpha\beta\chi} == 0$	$\sigma_2^{\#1\alpha\beta\chi} == 0$	5
Total #:		13

### Lagrangian density

$$\begin{aligned} & -\frac{1}{2}r_3\partial_\lambda\omega_\kappa^{\lambda\lambda}\partial'_\lambda\omega_\lambda^\alpha - r_5\partial_\lambda\omega_\kappa^{\lambda\lambda}\partial'_\lambda\omega_\lambda^\alpha + \frac{1}{2}r_3\partial_\alpha\omega_\lambda^\alpha\partial_\kappa\omega^{\theta\kappa\lambda} - \\ & r_5\partial_\alpha\omega_\lambda^\alpha\partial_\theta\partial_\kappa\omega^{\theta\kappa\lambda} - \frac{1}{2}r_3\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial_\kappa\omega^{\theta\kappa\lambda} + r_5\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial_\kappa\omega^{\theta\kappa\lambda} - \\ & \frac{1}{2}r_3\partial_\alpha\omega_\lambda^\alpha\partial_\theta\partial_\kappa\omega^{\kappa\lambda\theta} - r_5\partial_\alpha\omega_\lambda^\alpha\partial_\theta\partial_\kappa\omega^{\kappa\lambda\theta} + r_3\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial_\kappa\omega^{\kappa\lambda\theta} + \\ & 2r_5\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial_\kappa\omega^{\kappa\lambda\theta} - 4r_3\partial^\beta\omega_\lambda^\alpha\partial_\lambda\omega_{\alpha\beta}^{'\lambda} - \frac{1}{2}r_3\partial_\alpha\omega_\lambda^\alpha\partial_\theta\partial^\lambda\omega^{\theta\kappa}_\kappa + \\ & r_5\partial_\alpha\omega_\lambda^\alpha\partial_\theta\partial^\lambda\omega^{\theta\kappa}_\kappa + \frac{1}{2}r_3\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial^\lambda\omega^{\theta\kappa}_\kappa - r_5\partial_\theta\omega_\lambda^\alpha\partial_\alpha\partial^\lambda\omega^{\theta\kappa}_\kappa \end{aligned}$$

Added source term:  $\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}$



Quadratic pole

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Pole residue:  $-\frac{1}{r_3(2r_3+r_5)(r_3+2r_5)} > 0$

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Polarisations: 2

Unitarity conditions

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$$r_3 < 0 \&\& (r_5 < -\frac{r_3}{2} \parallel r_5 > -2r_3) \parallel r_3 > 0 \&\& -2r_3 < r_5 < -\frac{r_3}{2}$$

(No massive particles)