

## Lagrangian density

$$\begin{aligned}
 & -r_5 \partial_\lambda \omega^\kappa{}_\kappa \partial'_\lambda \omega^\alpha{}_\alpha - \frac{2}{3} r_1 \partial^\beta \omega^{\theta\alpha}{}_\kappa \partial_\theta \omega^\kappa{}_\alpha \\
 & + \frac{2}{3} r_1 \partial_\theta \omega^\kappa{}_\alpha \partial_\kappa \omega^{\alpha\beta\theta} + \frac{2}{3} r_1 \partial_\theta \omega^\kappa{}_\alpha \partial_\kappa \omega^{\theta\alpha\beta} - r_5 \partial_\alpha \omega^\alpha{}_\lambda \partial_\theta \omega^{\theta\kappa\lambda} + \\
 & r_5 \partial_\theta \omega^\alpha{}_\lambda \partial_\kappa \omega^{\theta\kappa\lambda} - r_5 \partial_\alpha \omega^\alpha{}_\lambda \partial_\theta \omega^{\kappa\lambda\theta} + 2 r_5 \partial_\theta \omega^\alpha{}_\lambda \partial_\alpha \partial_\kappa \omega^{\kappa\lambda\theta} + \\
 & \frac{2}{3} r_1 \partial_\kappa \omega^{\alpha\beta\theta} \partial^\kappa \omega_{\alpha\beta\theta} - \frac{2}{3} r_1 \partial_\kappa \omega^{\theta\alpha\beta} \partial^\kappa \omega_{\alpha\beta\theta} + \frac{2}{3} r_1 \partial^\beta \omega^\alpha{}_\lambda \partial_\lambda \omega_{\alpha\beta}{}^\gamma - \\
 & \frac{8}{3} r_1 \partial^\beta \omega^\lambda{}_\lambda \partial_\lambda \omega^\alpha{}_\beta{}^\gamma + r_5 \partial_\alpha \omega^\alpha{}_\lambda \partial_\theta \omega^{\theta\kappa}{}_\kappa - r_5 \partial_\theta \omega^\alpha{}_\lambda \partial_\alpha \partial^\lambda \omega^{\theta\kappa}{}_\kappa
 \end{aligned}$$

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

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

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

$$\begin{array}{c}
 \sigma_{1+}^{\#1} \quad \sigma_{1+}^{\#2} \quad \sigma_{1-}^{\#1} \quad \sigma_{1-}^{\#2} \\
 \begin{array}{|c|c|c|c|} \hline \frac{1}{k^2(2r_1+r_5)} & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & \frac{1}{k^2(r_1+r_5)} & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline \end{array} \\
 \begin{array}{c} \sigma_{1+}^{\#1} \quad \sigma_{1+}^{\#2} \\ \sigma_{1-}^{\#1} \quad \sigma_{1-}^{\#2} \end{array}
 \end{array}$$

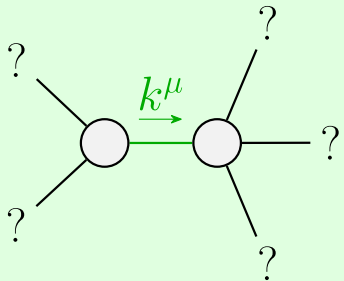
$$\begin{array}{c}
 \omega_{1+}^{\#1} \quad \omega_{1+}^{\#2} \quad \omega_{1-}^{\#1} \quad \omega_{1-}^{\#2} \\
 \begin{array}{|c|c|c|c|} \hline k^2(2r_1+r_5) & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & k^2(r_1+r_5) & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline \end{array} \\
 \begin{array}{c} \omega_{1+}^{\#1} \quad \omega_{1+}^{\#2} \\ \omega_{1-}^{\#1} \quad \omega_{1-}^{\#2} \end{array}
 \end{array}$$

$$\begin{array}{c}
 \omega_{2+}^{\#1} \quad \omega_{2-}^{\#1} \\
 \begin{array}{|c|c|} \hline 0 & 0 \\ \hline 0 & k^2 r_1 \\ \hline \end{array} \\
 \begin{array}{c} \omega_{2+}^{\#1} \quad \omega_{2-}^{\#1} \\ \omega_{2+}^{\#1} \quad \omega_{2-}^{\#1} \end{array}
 \end{array}$$

$$\begin{array}{c}
 \sigma_{2+}^{\#1} \quad \sigma_{2-}^{\#1} \\
 \begin{array}{|c|c|} \hline 0 & 0 \\ \hline 0 & \frac{1}{k^2 r_1} \\ \hline \end{array} \\
 \begin{array}{c} \sigma_{2+}^{\#1} \quad \sigma_{2-}^{\#1} \\ \sigma_{2+}^{\#1} \quad \sigma_{2-}^{\#1} \end{array}
 \end{array}$$

## Source constraints

SO(3) irreps	#
$\sigma_{0-}^{\#1} == 0$	1
$\sigma_{0+}^{\#1} == 0$	1
$\sigma_{1-}^{\#2\alpha} == 0$	3
$\sigma_{1+}^{\#2\alpha\beta} == 0$	3
$\sigma_{2+}^{\#1\alpha\beta} == 0$	5
Total #:	13



Quadratic pole

Pole residue:	$-\frac{1}{r_1(r_1+r_5)(2r_1+r_5)} > 0$
Polarisations:	2

(No massive particles)

## Unitarity conditions

$$r_1 < 0 \&\& (r_5 < -r_1 \parallel r_5 > -2r_1) \parallel r_1 > 0 \&\& -2r_1 < r_5 < -r_1$$