

## Lagrangian density

$$\begin{aligned}
 & -\frac{1}{2} r_3 \partial_\mu \omega_\kappa^{\kappa\lambda} \partial'_\mu \omega_\lambda^\alpha - r_5 \partial_\mu \omega_\kappa^{\kappa\lambda} \partial'_\mu \omega_\lambda^\alpha + \\
 & \frac{2}{3} r_2 \partial^\beta \omega_\kappa^{\theta\alpha} \partial_\theta \omega_{\alpha\beta}^\kappa - \frac{1}{3} r_2 \partial_\theta \omega_{\alpha\beta}^\kappa \partial_\kappa \omega^{\alpha\beta\theta} - \\
 & \frac{2}{3} r_2 \partial_\theta \omega_{\alpha\beta}^\kappa \partial_\kappa \omega^{\theta\alpha\beta} + \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 \omega^{\theta\kappa\lambda} - \\
 & \frac{1}{2} r_3 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\theta\kappa\lambda} + r_5 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\theta\kappa\lambda} - \frac{1}{2} r_3 \partial_\alpha \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa\lambda\theta} - \\
 & r_5 \partial_\alpha \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa\lambda\theta} + r_3 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa\lambda\theta} + 2 r_5 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa\lambda\theta} + \\
 & \frac{1}{3} r_2 \partial_\kappa \omega^{\alpha\beta\theta} \partial^\kappa \omega_{\alpha\beta\theta} + \frac{2}{3} r_2 \partial_\kappa \omega^{\theta\alpha\beta} \partial^\kappa \omega_{\alpha\beta\theta} - \frac{2}{3} r_2 \partial^\beta \omega_{\alpha\beta}^{\alpha\lambda} \partial_\lambda \omega_{\alpha\beta}^{\alpha\lambda} + \\
 & \frac{2}{3} r_2 \partial^\beta \omega_{\alpha\beta}^{\lambda\alpha} \partial_\lambda \omega_{\alpha\beta}^{\alpha\lambda} - 4 r_3 \partial^\beta \omega_{\alpha\beta}^{\alpha\lambda} \partial_\lambda \omega_{\alpha\beta}^{\alpha\lambda} - \frac{1}{2} r_3 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta\kappa\lambda} + \\
 & r_5 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta\kappa\lambda} + \frac{1}{2} r_3 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\theta\kappa\lambda} - r_5 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\theta\kappa\lambda}
 \end{aligned}$$

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

	$\omega_{1^+}^{\#1}{}_{\alpha\beta}$	$\omega_{1^+}^{\#2}{}_{\alpha\beta}$	$\omega_{1^-}^{\#1}{}_{\alpha}$	$\omega_{1^-}^{\#2}{}_{\alpha}$
$\omega_{1^+}^{\#1}{}_{\alpha\beta} + \alpha\beta$	$k^2 (2r_3 + r_5)$	0	0	0
$\omega_{1^+}^{\#2}{}_{\alpha\beta} + \alpha\beta$	0	0	0	0
$\omega_{1^-}^{\#1}{}_{\alpha} + \alpha$	0	0	$\frac{1}{2} k^2 (r_3 + 2r_5)$	0
$\omega_{1^-}^{\#2}{}_{\alpha} + \alpha$	0	0	0	0

	$\sigma_{1^+}^{\#1}{}_{\alpha\beta}$	$\sigma_{1^+}^{\#2}{}_{\alpha\beta}$	$\sigma_{1^-}^{\#1}{}_{\alpha}$	$\sigma_{1^-}^{\#2}{}_{\alpha}$
$\sigma_{1^+}^{\#1}{}_{\alpha\beta} + \alpha\beta$	$\frac{1}{k^2 (2r_3 + r_5)}$	0	0	0
$\sigma_{1^+}^{\#2}{}_{\alpha\beta} + \alpha\beta$	0	0	0	0
$\sigma_{1^-}^{\#1}{}_{\alpha} + \alpha$	0	0	$\frac{2}{k^2 (r_3 + 2r_5)}$	0
$\sigma_{1^-}^{\#2}{}_{\alpha} + \alpha$	0	0	0	0

## Source constraints

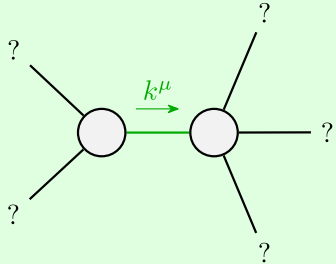
SO(3) irreps	#
$\sigma_{0^+}^{\#1} == 0$	1
$\sigma_{1^-}^{\#2\alpha} == 0$	3
$\sigma_{1^+}^{\#2\alpha\beta} == 0$	3
$\sigma_{2^-}^{\#1\alpha\beta\chi} == 0$	5
Total #:	12

	$\sigma_{2^+}^{\#1}{}_{\alpha\beta}$	$\sigma_{2^-}^{\#1}{}_{\alpha\beta\chi}$
$\sigma_{2^+}^{\#1}{}_{\alpha\beta} + \alpha\beta$	$-\frac{2}{3k^2 r_3}$	0
$\sigma_{2^-}^{\#1}{}_{\alpha\beta\chi} + \alpha\beta\chi$	0	0

	$\sigma_{0^+}^{\#1}$	$\sigma_{0^-}^{\#1}$
$\sigma_{0^+}^{\#1} + \alpha$	0	0
$\sigma_{0^-}^{\#1} + \alpha$	0	$\frac{1}{k^2 r_2}$

	$\omega_{0^+}^{\#1}$	$\omega_{0^-}^{\#1}$
$\omega_{0^+}^{\#1} + \alpha$	0	0
$\omega_{0^-}^{\#1} + \alpha$	0	$k^2 r_2$

	$\omega_{2^+}^{\#1}{}_{\alpha\beta}$	$\omega_{2^-}^{\#1}{}_{\alpha\beta\chi}$
$\omega_{2^+}^{\#1}{}_{\alpha\beta} + \alpha\beta$	$-\frac{3k^2 r_3}{2}$	0
$\omega_{2^-}^{\#1}{}_{\alpha\beta\chi} + \alpha\beta\chi$	0	0



Quadratic pole

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

Polarisations: 2

(No massive particles)

## Unitarity conditions

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