

$$\sigma_{2^+ \alpha \beta}^{#1} \quad \sigma_{2^- \alpha \beta \chi}^{#1}$$

$\sigma_{2^+ \alpha \beta}^{#1} + \alpha \beta$	0	0
$\sigma_{2^- \alpha \beta \chi}^{#1} + \alpha \beta \chi$	0	$\frac{1}{k^2 r_1}$

$$\omega_{0^+}^{#1} \quad \omega_{0^-}^{#1}$$

$\omega_{0^+}^{#1} \dagger$	$6 k^2 (-r_1 + r_3)$	0
$\omega_{0^-}^{#1} \dagger$	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
$\sigma_{2^+}^{#1 \alpha \beta} == 0$	5
Total #:	12

$$\omega_{2^+ \alpha \beta}^{#1} \quad \omega_{2^- \alpha \beta \chi}^{#1}$$

$\omega_{2^+ \alpha \beta}^{#1} \dagger$	0	0
$\omega_{2^- \alpha \beta \chi}^{#1} \dagger$	0	$k^2 r_1$

$$\sigma_{0^+}^{#1} \quad \sigma_{0^-}^{#1}$$

$\sigma_{0^+}^{#1} \dagger$	$\frac{1}{6 k^2 (-r_1 + r_3)}$	0
$\sigma_{0^-}^{#1} \dagger$	0	0

Lagrangian density

$$\begin{aligned}
& 2 r_1 \partial_\mu \omega_\kappa^{\kappa \lambda} \partial'_\mu \omega_\lambda^\alpha - 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_1 \partial^\beta \omega_\kappa^{\theta \alpha} \partial_\theta \omega_{\alpha \beta}^\kappa - \frac{2}{3} r_1 \partial_\theta \omega_\alpha^{\kappa \lambda} \partial_\kappa \omega^{\theta \alpha \beta} - 2 r_1 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta \kappa \lambda} + 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} + 2 r_1 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\theta \kappa \lambda} - 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} + 2 r_1 \partial_\alpha \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa \lambda \theta} - 2 r_3 \partial_\alpha \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa \lambda \theta} - \\
& r_5 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\kappa \lambda \theta} - 4 r_1 \partial_\theta \omega_\lambda^\alpha \partial_\kappa \omega^{\kappa \lambda \theta} + 4 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{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_{\lambda'}^{\alpha \lambda} \partial_\lambda \omega_{\alpha \beta}' + \frac{4}{3} r_1 \partial^\beta \omega_{\lambda'}^{\lambda \alpha} \partial_\lambda \omega_{\alpha \beta}' - 4 r_3 \partial^\beta \omega_{\lambda'}^{\lambda \alpha} \partial_\lambda \omega_{\alpha \beta}' + \\
& 2 r_1 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta \kappa} - 2 r_3 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta \kappa} + r_5 \partial_\alpha \omega_\lambda^\alpha \partial_\theta \omega^{\theta \kappa} - \\
& 2 r_1 \partial_\theta \omega_\lambda^\alpha \partial^\lambda \omega^{\theta \kappa} + 2 r_3 \partial_\theta \omega_\lambda^\alpha \partial^\lambda \omega^{\theta \kappa} - r_5 \partial_\theta \omega_\lambda^\alpha \partial^\lambda \omega^{\theta \kappa}
\end{aligned}$$

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

$$\omega_{1^+ \alpha \beta}^{#1} \quad \omega_{1^+ \alpha \beta}^{#2} \quad \omega_{1^- \alpha}^{#1} \quad \omega_{1^- \alpha}^{#2}$$

$\omega_{1^+ \alpha \beta}^{#1} \dagger$	$k^2 (2 r_3 + r_5)$	0	0	0
$\omega_{1^+ \alpha \beta}^{#2} \dagger$	0	0	0	0
$\omega_{1^- \alpha}^{#1} \dagger$	0	0	$k^2 (-r_1 + 2 r_3 + r_5)$	0
$\omega_{1^- \alpha}^{#2} \dagger$	0	0	0	0

$$\sigma_{1^+ \alpha \beta}^{#1} \quad \sigma_{1^+ \alpha \beta}^{#2} \quad \sigma_{1^- \alpha}^{#1} \quad \sigma_{1^- \alpha}^{#2}$$

$\sigma_{1^+ \alpha \beta}^{#1} \dagger$	$\frac{1}{k^2 (2 r_3 + r_5)}$	0	0	0
$\sigma_{1^+ \alpha \beta}^{#2} \dagger$	0	0	0	0
$\sigma_{1^- \alpha}^{#1} \dagger$	0	0	$\frac{1}{k^2 (-r_1 + 2 r_3 + r_5)}$	0
$\sigma_{1^- \alpha}^{#2} \dagger$	0	0	0	0

Quadratic pole

Pole residue:	$\frac{1}{r_1 (r_1 - 2 r_3 - r_5) (2 r_3 + r_5)} > 0$
Polarisations:	2

(No massive particles)

Unitarity conditions

$$r_1 < 0 \ \&\& \ (r_5 < r_1 - 2 r_3 \parallel r_5 > -2 r_3) \parallel r_1 > 0 \ \&\& \ -2 r_3 < r_5 < r_1 - 2 r_3$$