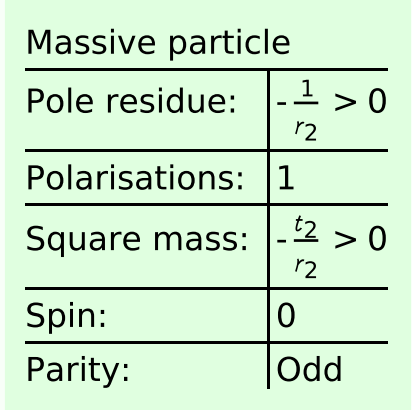


Wave operator and propagator



(No massless particles)

$$r_2 < 0 \ \&\& \ t_2 > 0$$

$\frac{1}{6}(9k^2r_3+4t_2)$	$\frac{\sqrt{2}t_2}{3}$	$\frac{1}{3}i\sqrt{2}kt_2$	0	0	0	0
$\omega_1^{\#1} + \alpha\beta$						
$\frac{\sqrt{2}t_2}{3}$	$\frac{t_2}{3}$	$\frac{ikt_2}{3}$	0	0	0	0
$\omega_1^{\#2} + \alpha\beta$						
$-\frac{1}{3}i\sqrt{2}kt_2$	$-\frac{1}{3}i\sqrt{2}kt_2$	$\frac{k^2t_2}{3}$	0	0	0	0
$f_1^{\#1} + \alpha\beta$						
$\omega_1^{\#1} + \alpha$	0	0	$\frac{2t_3}{3}$	$-\frac{\sqrt{2}t_3}{3}$	0	$-\frac{2}{3}i\sqrt{2}kt_3$
$\omega_1^{\#2} + \alpha$	0	0	$-\frac{\sqrt{2}t_3}{3}$	$\frac{t_3}{3}$	0	$\frac{1}{3}i\sqrt{2}kt_3$
$f_1^{\#1} + \alpha$	0	0	0	0	0	0
$f_1^{\#2} + \alpha$	0	0	$\frac{2ikt_3}{3}$	$-\frac{1}{3}i\sqrt{2}kt_3$	0	$\frac{2k^2t_3}{3}$

$$\begin{aligned}
\text{Quadratic (free) action} \\
S = & \iiint \left(\frac{1}{6} (-4t_3 \omega_{\alpha}^{\alpha'} \omega_{\kappa}^{\kappa} + 6f^{\alpha\beta} \tau_{\alpha\beta} + 6\omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + 8t_3 \omega_{\kappa}^{\kappa} \partial_{\kappa} f^{\alpha\iota} - 8t_3 \omega_{\iota}^{\iota} \omega_{\kappa}^{\kappa} \right. \\
& \partial_{\kappa} f^{\alpha} + 4t_3 \partial_{\iota} f_{\kappa}^{\kappa} \partial_{\iota} f_{\alpha}^{\alpha} - 6r_3 \partial_{\beta} \omega_{\iota}^{\theta} \partial_{\theta} \omega_{\alpha}^{\alpha\beta} - 6r_3 \partial_{\alpha} \omega^{\alpha\beta\iota} \partial_{\beta} \omega_{\theta}^{\theta} + \\
& 12r_3 \partial_{\iota} \omega_{\alpha}^{\alpha\beta} \partial_{\theta} \omega_{\iota}^{\theta} + 4t_2 \omega_{\iota\theta\alpha} \partial^{\theta} f^{\alpha\iota} + 2t_2 \partial_{\alpha} f_{\theta}^{\theta} \partial^{\theta} f^{\alpha\iota} - t_2 \partial_{\alpha} f_{\theta\iota}^{\theta} \partial^{\theta} f^{\alpha\iota} - \\
& t_2 \partial_{\iota} f_{\alpha\theta}^{\theta} \partial^{\theta} f^{\alpha\iota} + t_2 \partial_{\theta} f_{\alpha\iota}^{\theta} \partial^{\theta} f^{\alpha\iota} - t_2 \partial_{\theta} f_{\iota\alpha}^{\theta} \partial^{\theta} f^{\alpha\iota} - 4t_2 \omega_{\alpha\theta\iota} (\omega^{\alpha\iota\theta} + \partial^{\theta} f^{\alpha\iota}) + \\
& 2t_2 \omega_{\alpha\iota\theta} (\omega^{\alpha\iota\theta} + 2\partial^{\theta} f^{\alpha\iota}) + 8r_2 \partial_{\beta} \omega_{\alpha\iota\theta} \partial^{\theta} \omega^{\alpha\beta\iota} - 4r_2 \partial_{\beta} \omega_{\alpha\theta\iota} \partial^{\theta} \omega^{\alpha\beta\iota} + 4r_2 \\
& \partial_{\beta} \omega_{\iota\theta\alpha} \partial^{\theta} \omega^{\alpha\beta\iota} - 24r_3 \partial_{\beta} \omega_{\iota\theta\alpha} \partial^{\theta} \omega^{\alpha\beta\iota} - 2r_2 \partial_{\iota} \omega_{\alpha\beta\theta} \partial^{\theta} \omega^{\alpha\beta\iota} + 2r_2 \partial_{\theta} \omega_{\alpha\beta\iota} \partial^{\theta} \omega^{\alpha\beta\iota} - \\
& 4r_2 \partial_{\theta} \omega_{\alpha\iota\beta} \partial^{\theta} \omega^{\alpha\beta\iota} + 4t_3 \partial_{\iota} f^{\alpha\iota} \partial_{\kappa} f_{\alpha}^{\kappa} - 8t_3 \partial_{\kappa} f_{\alpha}^{\kappa} \partial_{\iota} f_{\alpha}^{\alpha} \partial_{\kappa} f_{\iota}^{\iota}) [t, x, y, z] dz dy dx dt
\end{aligned}$$

$\omega_2^{\#1} + \alpha\beta$	$\omega_2^{\#1} + \alpha\beta$	$\omega_2^{\#1} + \alpha\beta$	$\omega_2^{\#1} + \alpha\beta$
$-\frac{3k^2 r_3}{2}$	0	0	0
0	0	0	0
0	0	0	0

$\sigma_0^{\#1} +$	$\frac{1}{(1+2k^2)^2 t_3}$	$-\frac{i\sqrt{2}k}{(1+2k^2)^2 t_3}$	0	0
$\tau_0^{\#1} +$	$\frac{i\sqrt{2}k}{(1+2k^2)^2 t_3}$	$\frac{2k^2}{(1+2k^2)^2 t_3}$	0	0
$\tau_0^{\#2} +$	0	0	0	0
$\sigma_0^{\#1} +$	0	0	0	$\frac{1}{k^2 r_2 + t_2}$