

Particle spectrograph

Wave operator and propagator

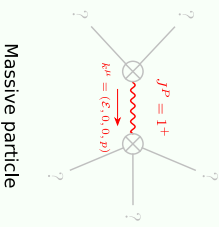
Spin-parity form	Covariant form	Multiplicities
$\begin{matrix} \#2 \\ 0^+ \tau \end{matrix} \tau = 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} = 0$	1
$\begin{matrix} \#1 \\ 1^- \alpha \end{matrix} \alpha = 0$	$\partial_\chi \partial_\beta \partial_\alpha \tau^{\alpha\beta} \chi_\beta = \partial_\chi \partial^\beta \partial_\beta \tau^{\alpha\beta}$	3
$\begin{matrix} \#1 \\ 2^+ \alpha\beta \end{matrix} \alpha\beta = 0$	$\begin{aligned} &\partial_\chi \partial_\beta \partial_\chi \partial^\beta \partial_\alpha \tau^{\alpha\chi} + 3 \partial_\beta \partial^\beta \partial_\alpha \tau^{\alpha\chi} + 3 \partial_\beta \partial^\beta \partial_\chi \tau^{\alpha\beta} + \\ &2 \eta^{\alpha\beta} \partial_\alpha \partial^\beta \partial_\beta \tau^{\alpha\chi} = 3 \partial_\beta \partial^\beta \partial_\chi \tau^{\alpha\beta} + 3 \partial_\beta \partial^\beta \partial_\alpha \tau^{\beta\chi} + \\ &3 \partial_\beta \partial^\beta \partial_\chi \tau^{\alpha\beta} + 3 \partial_\beta \partial^\beta \partial_\alpha \tau^{\beta\chi} + 2 \eta^{\alpha\beta} \partial_\beta \partial^\beta \tau^{\alpha\chi} \end{aligned}$	5
Total expected gauge generators:		9

$$S = \iiint (\beta \mathcal{B}_{\alpha\beta} \mathcal{G}^{\alpha\beta} + f^{\alpha\beta} \tau_{\alpha\beta} + \mathcal{G}^{\alpha\beta} \mathcal{J}_{\alpha\beta} + c_3 (\partial_\beta f^\alpha \partial^\beta f_\alpha - 2 \partial_\beta f^\alpha \partial_\alpha f^\beta + \partial_\beta f^\alpha \partial_\alpha f^\beta + 2 \partial_\chi \mathcal{B}_\alpha^{\alpha\beta} \partial_\beta \chi^\alpha) - \partial_\alpha \mathcal{G}^{\alpha\beta} \partial_\chi \mathcal{B}_\beta^\chi - 2 \partial_\beta f^\alpha \partial_\alpha \partial_\chi \mathcal{B}_\beta^\chi - \frac{1}{3} \alpha (2 \partial_\beta \mathcal{B}_{\alpha\chi} - \partial_\chi \mathcal{B}_{\alpha\beta}) \partial^\beta \mathcal{G}^{\alpha\beta} + 2 c_1 (2 \partial_\alpha \partial_\beta \partial_\chi f^{\alpha\beta} - \partial_\alpha \partial_\beta \partial_\chi \mathcal{B}^{\alpha\beta} + 4 \partial_\alpha \partial_\beta \mathcal{B}_{\chi\beta} - \partial_\chi f^{\alpha\beta} - \partial_\beta f^\alpha \partial_\alpha \mathcal{G}^{\alpha\beta} - 4 \partial_\beta \mathcal{B}_{\alpha\chi} \partial^\alpha \mathcal{G}^{\alpha\beta} + \partial_\chi f^{\alpha\beta} - \partial_\beta f^\alpha \partial_\alpha \mathcal{G}^{\alpha\beta} + 4 \partial_\chi \mathcal{B}_{\alpha\beta} \partial^\alpha \mathcal{G}^{\alpha\beta} - 4 \partial_\beta \mathcal{B}_{\alpha\chi} \partial^\alpha \mathcal{G}^{\alpha\beta} + 2 \partial_\chi \mathcal{B}_{\alpha\beta} \partial^\alpha \mathcal{G}^{\alpha\beta})) [t, x, y, z] d x d y d z d t$$

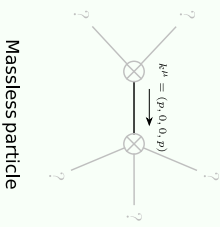
$\begin{matrix} \#1 \\ 0^+ \tau \end{matrix} \tau$	$\begin{matrix} \#2 \\ 0^+ \tau \end{matrix} \tau$	$\begin{matrix} \#1 \\ 0^+ f \end{matrix} f$	$\begin{matrix} \#2 \\ 0^+ f \end{matrix} f$	$\begin{matrix} \#1 \\ 2^+ f \end{matrix} \alpha\beta$	$\begin{matrix} \#1 \\ 2^+ \tau \end{matrix} \alpha\beta$
$\frac{1}{3 c_3 k^2}$	0	0	0	0	0
0	0	$3 c_3 k^2$	0	0	0
$\begin{matrix} \#1 \\ 1^+ \mathcal{J} \end{matrix} \alpha\beta$	$\begin{matrix} \#1 \\ 1^+ \tau \end{matrix} \alpha\beta$	$\begin{matrix} \#1 \\ 1^+ \mathcal{J} \end{matrix} \alpha$	$\begin{matrix} \#1 \\ 1^+ \tau \end{matrix} \alpha$	$\begin{matrix} \#1 \\ 1^+ f \end{matrix} \alpha$	$\begin{matrix} \#2 \\ 1^+ f \end{matrix} \alpha$
$\frac{1}{k^2 \frac{\alpha}{3} + \beta}$	$-\frac{3}{k^2 \alpha + 3 \beta}$	0	0	0	0
$-\frac{3}{k^2 \alpha + 3 \beta}$	$\frac{1}{4 c_1 k^2} + \frac{1}{\frac{\alpha^2}{3} + \beta}$	0	0	0	0
0	0	$\frac{1}{\beta}$	0	$-\frac{1}{\sqrt{2} \beta}$	0
0	0	0	0	0	0
0	0	$-\frac{1}{\sqrt{2} \beta}$	0	$\frac{1}{c_3 k^2} + \frac{1}{2 \beta}$	0
$\begin{matrix} \#1 \\ 1^+ \mathcal{B} \end{matrix} \alpha\beta$	$\begin{matrix} \#1 \\ 1^+ f \end{matrix} \alpha\beta$	$\begin{matrix} \#1 \\ 1^+ \mathcal{B} \end{matrix} \alpha$	$\begin{matrix} \#1 \\ 1^+ f \end{matrix} \alpha$	$\begin{matrix} \#1 \\ 1^+ \mathcal{B} \end{matrix} \alpha$	$\begin{matrix} \#1 \\ 1^+ f \end{matrix} \alpha$
$\frac{1}{3} k^2 (12 c_1 + \alpha) + \beta$	$4 c_1 k^2$	0	0	$\frac{c_3 k^2}{2} + \beta$	$\frac{c_3 k^2}{\sqrt{2}}$
$4 c_1 k^2$	$4 c_1 k^2$	0	0	0	0
0	0	0	0	$\frac{c_3 k^2}{\sqrt{2}}$	$c_3 k^2$
0	0	0	0	0	0

Massive and massless spectra

Poleresidue:	$\frac{6}{\alpha} > 0$
Square mass:	$\frac{3 \beta}{\alpha} > 0$
Spin:	1
Parity:	Even



Poleresidue:	$\frac{1}{c_1} > 0$
Polarisations:	1



Unitarity conditions