Particle spectrograph

Wave operator and propagator

Spin-parity form	Covariant form	Multiplicities
$\overset{\#1}{0^+}\sigma == 0$	$\partial_\beta \sigma^{\alpha\beta}{}_\alpha == 0$	1
$\overset{\#1}{0^+}\tau == 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} == \partial_\theta \partial^\beta \tau^\alpha{}_\alpha$	1
$\overset{\#2}{0^+}\tau == 0$	$\partial_\beta \partial_\alpha \tau^{\alpha\beta} == 0$	1
$\overset{\#2}{1^-}\tau^\alpha == 0$	$\partial_\chi \partial_\beta \partial^\alpha \tau^{\beta\chi} == \partial_\chi \partial^\chi \partial_\beta \tau^{\alpha\beta}$	3
$\overset{\#1}{1^-}\tau^\alpha == 0$	$\partial_\chi \partial_\beta \partial^\alpha \tau^{\beta\chi} == \partial_\chi \partial^\chi \partial_\beta \tau^{\beta\alpha}$	3
$\overset{\#2}{1^-}\sigma^\alpha == 0$	$\partial_\chi \partial_\beta \sigma^{\alpha\beta\chi} == 0$	3
$\overset{\#1}{1^+}\tau^{\alpha\beta} + i\, k\, \overset{\#2}{1^+}\sigma^{\alpha\beta} == 0$	$\partial_\chi \partial^\alpha \tau^{\beta\chi} + \partial_\chi \partial^\beta \tau^{\chi\alpha} + \partial_\chi \partial^\chi \tau^{\alpha\beta} + 2\, \partial_\delta \partial_\chi \partial^\alpha \sigma^{\beta\chi\delta} + 2\, \partial_\delta \partial^\delta \partial_\chi \sigma^{\alpha\beta\chi} ==$ $\partial_\chi \partial^\alpha \tau^{\chi\beta} + \partial_\chi \partial^\beta \tau^{\alpha\chi} + \partial_\chi \partial^\chi \tau^{\beta\alpha} + 2\, \partial_\delta \partial_\chi \partial^\beta \sigma^{\alpha\chi\delta}$	3
$\overset{\#1}{2^-}\sigma^{\alpha\beta\chi} == 0 \qquad 3$	$\partial_\epsilon \partial_\delta \partial^\chi \partial_\sigma \sigma^{\beta\delta\epsilon} + 3\, \partial_\epsilon \partial^\epsilon \partial^\chi \partial_\sigma \sigma^{\beta\delta}{}_\delta + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\beta \sigma^{\alpha\chi\delta} +$ $4\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\beta \sigma^{\alpha\delta\chi} + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\chi\delta\alpha} + 4\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\chi \sigma^{\alpha\beta\delta} +$ $2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\chi \sigma^{\alpha\delta\beta} + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\beta\chi\alpha} + 3\, \eta^{\beta\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial^\alpha \sigma^{\delta\epsilon}{}_\delta +$ $3\, \eta^{\alpha\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial_\delta \sigma^{\beta\delta\epsilon} + 3\, \eta^{\beta\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial^\alpha \sigma^{\epsilon\delta}{}_\delta ==$ $3\, \partial_\epsilon \partial_\delta \partial^\chi \partial^\beta \sigma^{\alpha\delta\epsilon} + 3\, \partial_\epsilon \partial^\epsilon \partial^\chi \partial^\beta \sigma^{\alpha\delta}{}_\delta + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\beta\chi\delta} +$ $4\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\beta\delta\chi} + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\alpha \sigma^{\chi\delta\beta} + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\beta\delta\alpha} +$ $4\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\alpha\beta\chi} + 2\, \partial_\epsilon \partial^\epsilon \partial_\delta \partial^\delta \sigma^{\alpha\chi\beta} + 3\, \eta^{\alpha\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial^\beta \sigma^{\delta\epsilon}{}_\delta +$ $3\, \eta^{\beta\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial_\delta \sigma^{\alpha\delta\epsilon} + 3\, \eta^{\alpha\chi}\, \partial_\phi \partial^\phi \partial_\epsilon \partial^\epsilon \sigma^{\beta\delta}{}_\delta$	5
$\overset{\#1}{2^+}\tau^{\alpha\beta} == 0 \qquad 4$	$\partial_\delta \partial_\chi \partial^\beta \partial^\alpha \tau^{\chi\delta} + 2\, \partial_\delta \partial^\delta \partial^\beta \partial^\alpha \tau^\chi{}_\chi + 3\, \partial_\delta \partial^\delta \partial_\chi \partial^\chi \tau^{\alpha\beta} + 3\, \partial_\delta \partial^\delta \partial_\chi \partial^\alpha \tau^{\beta\alpha} +$ $2\, \eta^{\alpha\beta}\, \partial_\epsilon \partial_\delta \partial_\chi \tau^{\chi\delta} == 3\, \partial_\delta \partial^\delta \partial_\chi \partial^\alpha \tau^{\beta\chi} + 3\, \partial_\delta \partial^\delta \partial_\chi \partial^\alpha \tau^{\chi\beta} +$ $3\, \partial_\delta \partial^\delta \partial_\chi \partial^\beta \tau^{\alpha\chi} + 3\, \partial_\delta \partial^\delta \partial_\chi \partial^\beta \tau^{\chi\alpha} + 2\, \eta^{\alpha\beta}\, \partial_\epsilon \partial_\delta \partial^\delta \tau^\chi{}_\chi$	5
Total expected gauge generators:		25

$$S == \iiiint \left(\tfrac{1}{6}\left(6\, f^{\alpha\beta}\, \tau_{\alpha\beta} + 6\, \mathcal{A}^{\alpha\beta\chi}\, \sigma_{\alpha\beta\chi} - 3\, r_3 \partial_\beta \mathcal{A}^\theta{}_{i\,\theta}\, \partial^i \mathcal{A}^{\alpha\beta}{}_\alpha - 3\, r_3 \partial_\alpha \mathcal{A}^{\alpha\beta}{}_{\beta\,\theta}\, \partial_\theta \mathcal{A}^\theta{}_{\beta\,i} + 6\, r_3 \cdots \right. \right) dt \times dx \times dy \times dz$$

Massive and massless spectra

Massless particle

Pole residue:	$\dfrac{1}{r_3\,(2\,r_3 + r_5)\,(r_3 + 2\,r_5)\,p^2} > 0$
Polarisations:	2

Unitarity conditions