Particle spectrograph

Wave operator and propagator

	$\overset{\#1}{1}^{+}\sigma_{\alpha\beta}$	$\overset{\#2}{1}^{+}\sigma_{\alpha\beta}$	$\overset{\#1}{1}^{+}\tau_{\alpha\beta}$	$\overset{\#1}{1}^{-}\sigma_{\alpha}$	$\overset{\#2}{1}^{-}\sigma_{\alpha}$	$\overset{\#1}{1}^{-}\tau_{\alpha}$	$\overset{\#2}{1}^{-}\tau_{\alpha}$
$\overset{\#1}{1}^{+}\sigma^{\dagger\,\alpha\beta}$	0	$\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)}$	$\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)}$	0	0	0	0
$\overset{\#2}{1}^{+}\sigma^{\dagger\,\alpha\beta}$	$\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+k^2)}$	$-\frac{2}{(\alpha_0-4\beta_1)(1+k^2)^2}$	$-\frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2}$	0	0	0	0
$\overset{\#1}{1}^{+}\tau^{\dagger\,\alpha\beta}$	$-\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+k^2)}$	$\frac{2ik}{(\alpha_0-4\beta_1)(1+k^2)^2}$	$-\frac{2k^2}{(\alpha_0-4\beta_1)(1+k^2)^2}$	0	0	0	0
$\overset{\#1}{1}^{-}\sigma^{\dagger\,\alpha}$	0	0	0	0	$-\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)}$	0	$-\frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)}$
$\overset{\#2}{1}^{-}\sigma^{\dagger\,\alpha}$	0	0	0	$-\frac{2\sqrt{2}}{(\alpha_0-4\beta_1)(1+2k^2)}$	$-\frac{2}{(\alpha_0-4\beta_1)(1+2k^2)^2}$	0	$-\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2}$
$\overset{\#1}{1}^{-}\tau^{\dagger\,\alpha}$	0	0	0	0	0	0	0
$\overset{\#2}{1}^{-}\tau^{\dagger\,\alpha}$	0	0	0	$\frac{4ik}{(\alpha_0-4\beta_1)(1+2k^2)}$	$\frac{2i\sqrt{2}k}{(\alpha_0-4\beta_1)(1+2k^2)^2}$	0	$-\frac{4k^2}{(\alpha_0-4\beta_1)(1+2k^2)^2}$

Spin-parity form	Covariant form	Multiplicities
$\overset{\#2}{0}^{+}\tau == 0$	$\partial_\beta\partial_\alpha\tau^{\alpha\beta} == 0$	1
$\overset{\#2}{1}^{-}\tau^{\alpha} + 2\,i\,k\,\overset{\#2}{1}^{-}\sigma^{\alpha} == 0$	$\partial_\chi\partial_\beta\partial^\alpha\tau^{\beta\chi} == \partial_\chi\partial^\chi\partial_\beta\tau^{\alpha\beta} + 2\,\partial_\delta\partial^\delta\partial_\chi\partial_\beta\sigma^{\alpha\beta\chi}$	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
$\overset{\#1}{1}^{+}\tau^{\alpha\beta} + i\,k\,\overset{\#2}{1}^{+}\sigma^{\alpha\beta} == 0$	$\partial_\chi\partial^\alpha\tau^{\beta\chi} + \partial_\chi\partial^\beta\tau^{\chi\alpha} + \partial_\chi\partial^\chi\tau^{\alpha\beta} + 2\,\partial_\delta\partial_\chi\partial^\alpha\sigma^{\beta\chi\delta} + 2\,\partial_\delta\partial^\delta\partial_\chi\sigma^{\alpha\beta\chi} == \partial_\chi\partial^\alpha\tau^{\chi\beta} + \partial_\chi\partial^\beta\tau^{\alpha\chi} + \partial_\chi\partial^\chi\tau^{\beta\alpha} + 2\,\partial_\delta\partial_\chi\partial^\beta\sigma^{\alpha\chi\delta}$	3
Total expected gauge generators:		10

$$
\begin{aligned}
S == \iiiint \Big(& f^{\alpha\beta}\,\tau_{\alpha\beta} + \mathcal{A}^{\alpha\beta\chi}\,\sigma_{\alpha\beta\chi} - \tfrac{1}{2}\alpha_0\big(\mathcal{A}_{\alpha\chi\beta}\,\mathcal{A}^{\alpha\beta\chi} + \mathcal{A}^{\alpha\beta}{}_{\alpha}\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi} + \\
& 2\,f^{\alpha\beta}\,\partial_\beta\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi} - 2\,\partial_\beta\mathcal{A}^{\alpha\beta}{}_{\alpha} - 2\,f^{\alpha\beta}\,\partial_\chi\mathcal{A}_{\alpha}{}^{\chi}{}_{\beta} + 2\,f^{\alpha}{}_{\alpha}\,\partial_\chi\mathcal{A}^{\beta\chi}{}_{\beta}\big) + \\
& \beta_1\big(2\,\mathcal{A}^{\alpha\beta}{}_{\alpha}\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi} - 4\,\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi}\,\partial_\beta f^{\alpha\beta} + 4\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi}\,\partial^\beta f^{\alpha}{}_{\alpha} - 2\,\partial_\beta f^{\chi}{}_{\chi}\,\partial^\beta f^{\alpha}{}_{\alpha} - \\
& 2\,\partial_\beta f^{\alpha\beta}\,\partial_\chi f_{\alpha}{}^{\chi} + 4\,\partial^\beta f^{\alpha}{}_{\alpha}\,\partial_\chi f_{\beta}{}^{\chi} - 2\,\partial_\alpha f_{\beta\chi}\,\partial^\chi f^{\alpha\beta} - \partial_\alpha f_{\chi\beta}\,\partial^\chi f^{\alpha\beta} + \\
& \partial_\beta f_{\alpha\chi}\,\partial^\chi f^{\alpha\beta} + \partial_\chi f_{\alpha\beta}\,\partial^\chi f^{\alpha\beta} + \partial_\chi f_{\beta\alpha}\,\partial^\chi f^{\alpha\beta} + 2\,\mathcal{A}_{\alpha\chi\beta}\,(\mathcal{A}^{\alpha\beta\chi} + 2\,\partial^\chi f^{\alpha\beta})\big) + \\
& \tfrac{1}{3}\alpha_3\big(4\,\partial_\beta\mathcal{A}_{\alpha\chi\delta} - 2\,\partial_\beta\mathcal{A}_{\alpha\delta\chi} + 2\,\partial_\beta\mathcal{A}_{\chi\delta\alpha} - \partial_\chi\mathcal{A}_{\alpha\beta\delta} + \partial_\delta\mathcal{A}_{\alpha\beta\chi} - 2\,\partial_\delta\mathcal{A}_{\alpha\chi\beta}\big) \\
& \partial^\delta\mathcal{A}^{\alpha\beta\chi}\Big)[t,x,y,z]\,dz\,dy\,dx\,dt
\end{aligned}
$$

	$\overset{\#1}{0}^{+}\mathcal{A}$	$\overset{\#1}{0}^{+}f$	$\overset{\#2}{0}^{+}f$	$\overset{\#1}{0}^{-}\mathcal{A}$
$\overset{\#1}{0}^{+}\mathcal{A}^{\dagger}$	$\frac{1}{2}(\alpha_0-4\beta_1)$	$-\frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}}$	0	0
$\overset{\#1}{0}^{+}f^{\dagger}$	$\frac{i(\alpha_0-4\beta_1)k}{\sqrt{2}}$	$-4\beta_1k^2$	0	0
$\overset{\#2}{0}^{+}f^{\dagger}$	0	0	0	0
$\overset{\#1}{0}^{-}\mathcal{A}^{\dagger}$	0	0	0	$\frac{\alpha_0}{2}-2\beta_1+\alpha_3k^2$

	$\overset{\#1}{1}^{+}\mathcal{A}_{\alpha\beta}$	$\overset{\#2}{1}^{+}\mathcal{A}_{\alpha\beta}$	$\overset{\#1}{1}^{+}f_{\alpha\beta}$	$\overset{\#1}{1}^{-}\mathcal{A}_{\alpha}$	$\overset{\#2}{1}^{-}\mathcal{A}_{\alpha}$	$\overset{\#1}{1}^{-}f_{\alpha}$	$\overset{\#2}{1}^{-}f_{\alpha}$
$\overset{\#1}{1}^{+}\mathcal{A}^{\dagger\,\alpha\beta}$	$\frac{1}{4}(\alpha_0-4\beta_1)$	$\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	$\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0	0	0	0
$\overset{\#2}{1}^{+}\mathcal{A}^{\dagger\,\alpha\beta}$	$\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	0	0	0	0	0	0
$\overset{\#1}{1}^{+}f^{\dagger\,\alpha\beta}$	$-\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0	0	0	0	0	0
$\overset{\#1}{1}^{-}\mathcal{A}^{\dagger\,\alpha}$	0	0	0	$\frac{1}{4}(\alpha_0-4\beta_1)$	$-\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	0	$-\frac{1}{2}i(\alpha_0-4\beta_1)k$
$\overset{\#2}{1}^{-}\mathcal{A}^{\dagger\,\alpha}$	0	0	0	$-\frac{\alpha_0-4\beta_1}{2\sqrt{2}}$	0	0	0
$\overset{\#1}{1}^{-}f^{\dagger\,\alpha}$	0	0	0	0	0	0	0
$\overset{\#2}{1}^{-}f^{\dagger\,\alpha}$	0	0	0	$\frac{1}{2}i(\alpha_0-4\beta_1)k$	0	0	0

	$\overset{\#1}{2}^{+}\sigma_{\alpha\beta}$	$\overset{\#1}{2}^{+}\tau_{\alpha\beta}$	$\overset{\#1}{2}^{-}\sigma_{\alpha\beta\chi}$
$\overset{\#1}{2}^{+}\sigma^{\dagger\,\alpha\beta}$	$-\frac{16\beta_1}{\alpha_0^2-4\alpha_0\beta_1}$	$\frac{2i\sqrt{2}}{\alpha_0k}$	0
$\overset{\#1}{2}^{+}\tau^{\dagger\,\alpha\beta}$	$-\frac{2i\sqrt{2}}{\alpha_0k}$	$\frac{2}{\alpha_0k^2}$	0
$\overset{\#1}{2}^{-}\sigma^{\dagger\,\alpha\beta\chi}$	0	0	$\frac{1}{-\frac{\alpha_0}{4}+\beta_1}$

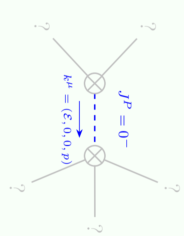
	$\overset{\#1}{2}^{+}\mathcal{A}_{\alpha\beta}$	$\overset{\#1}{2}^{+}f_{\alpha\beta}$	$\overset{\#1}{2}^{-}\mathcal{A}_{\alpha\beta\chi}$
$\overset{\#1}{2}^{+}\mathcal{A}^{\dagger\,\alpha\beta}$	$-\frac{\alpha_0}{4}+\beta_1$	$\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	0
$\overset{\#1}{2}^{+}f^{\dagger\,\alpha\beta}$	$-\frac{i(\alpha_0-4\beta_1)k}{2\sqrt{2}}$	$2\beta_1k^2$	0
$\overset{\#1}{2}^{-}\mathcal{A}^{\dagger\,\alpha\beta\chi}$	0	0	$-\frac{\alpha_0}{4}+\beta_1$

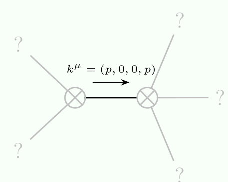
	$\overset{\#1}{0}^{+}\sigma$	$\overset{\#1}{0}^{+}\tau$	$\overset{\#2}{0}^{+}\tau$	$\overset{\#1}{0}^{-}\sigma$
$\overset{\#1}{0}^{+}\sigma^{\dagger}$	$\frac{8\beta_1}{\alpha_0^2-4\alpha_0\beta_1}$	$-\frac{i\sqrt{2}}{\alpha_0k}$	0	0
$\overset{\#1}{0}^{+}\tau^{\dagger}$	$\frac{i\sqrt{2}}{\alpha_0k}$	$-\frac{1}{\alpha_0k^2}$	0	0
$\overset{\#2}{0}^{+}\tau^{\dagger}$	0	0	0	0
$\overset{\#1}{0}^{-}\sigma^{\dagger}$	0	0	0	$\frac{2}{\alpha_0-4\beta_1+2\alpha_3k^2}$

Massive and massless spectra

Massive particle

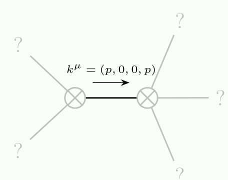
Pole residue:	$-\frac{1}{\alpha_3} > 0$
Square mass:	$-\frac{\alpha_0-4\beta_1}{2\alpha_3} > 0$
Spin:	0
Parity:	Odd





Massless particle

Poleresidue:	$\frac{1}{\alpha_0-4\beta_1} > 0$
Polarisations:	2



Massless particle

Poleresidue:	$\frac{1}{\alpha_0} > 0$
Polarisations:	2

Unitarity conditions