Particle spectrograph

Wave operator and propagator

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

$$\mathcal{S} == \iiiint \Big(f^{\alpha\beta}\,\tau_{\alpha\beta} + \mathcal{A}^{\alpha\beta\chi}\,\sigma_{\alpha\beta\chi} - \tfrac{1}{2}\alpha_0\big(\mathcal{A}_{\alpha\chi\beta}\,\mathcal{A}^{\alpha\beta\chi} + \mathcal{A}^{\alpha\beta}{}_{\alpha}\,\mathcal{A}_{\beta}{}^{\chi}{}_{\chi} + 2\,f^{\alpha\beta}\,\partial_\beta\mathcal{A}_{\alpha}{}^{\chi}{}_{\chi} - 2\,\partial_\beta\mathcal{A}^{\alpha\beta}{}_{\alpha} - 2\,f^{\alpha\beta}\,\partial_\chi\mathcal{A}_{\alpha}{}^{\chi}{}_{\beta} + 2\,f^{\alpha}{}_{\alpha}\,\partial_\chi\mathcal{A}^{\beta\chi}{}_{\beta}\big) + 2\,\alpha_1\big(4\,\partial_\beta\mathcal{A}_{\alpha\chi\delta} - 2\,\partial_\beta\mathcal{A}_{\alpha\delta\chi} + 2\,\partial_\beta\mathcal{A}_{\chi\delta\alpha} - \partial_\chi\mathcal{A}_{\alpha\beta\delta} + \partial_\delta\mathcal{A}_{\alpha\beta\chi} - 2\,\partial_\delta\mathcal{A}_{\alpha\chi\beta}\big)\,\partial^\delta\mathcal{A}^{\alpha\beta\chi}\Big)[t,x,y,z]\,dz\,dy\,dx\,dt$$

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

	$2^{+}\sigma^{\#1}_{\alpha\beta}$	$2^{+}\tau^{\#1}_{\alpha\beta}$	$2^{-}\sigma^{\#1}_{\alpha\beta\chi}$
$2^{+}\sigma^{\#1}{}^{\dagger\,\alpha\beta}$	0	$\frac{2 i\sqrt{2}}{\alpha_0 k}$	0
$2^{+}\tau^{\#1}{}^{\dagger\,\alpha\beta}$	$-\frac{2 i\sqrt{2}}{\alpha_0 k}$	$\frac{2}{\alpha_0 k^2}$	0
$2^{-}\sigma^{\#1}{}^{\dagger\,\alpha\beta\chi}$	0 0		$-\frac{4}{\alpha_0}$

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

	$0^{+}\sigma^{\#1}$	$0^{+}\tau^{\#1}$	$0^{+}\tau^{\#2}$	$0^{-}\sigma^{\#1}$
$0^{+}\sigma^{\#1}{}^{\dagger}$	0	$-\frac{i\sqrt{2}}{\alpha_0 k}$	0	0
$0^{+}\tau^{\#1}{}^{\dagger}$	$\frac{i\sqrt{2}}{\alpha_0 k}$	$-\frac{1}{\alpha_0 k^2}$	0	0
$0^{+}\tau^{\#2}{}^{\dagger}$	0	0	0	0
$0^{-}\sigma^{\#1}{}^{\dagger}$	0	0	0	$\frac{2}{\alpha_0+12\alpha_1 k^2}$

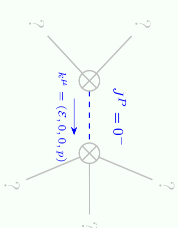
	$1^{+}\mathcal{A}^{\#1}_{\alpha\beta}$	$1^{+}\mathcal{A}^{\#2}_{\alpha\beta}$	$1^{+}f^{\#1}_{\alpha\beta}$	$1^{-}\mathcal{A}^{\#1}_{\alpha}$	$1^{-}\mathcal{A}^{\#2}_{\alpha}$	$1^{-}f^{\#1}_{\alpha}$	$1^{-}f^{\#2}_{\alpha}$
$1^{+}\mathcal{A}^{\#1}{}^{\dagger\,\alpha\beta}$	$\frac{\alpha_0}{4}$	$\frac{\alpha_0}{2\sqrt{2}}$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

	$0^{+}\mathcal{A}^{\#1}$	$0^{+}f^{\#1}$	$0^{+}f^{\#2}$	$0^{-}\mathcal{A}^{\#1}$
$0^{+}\mathcal{A}^{\#1}{}^{\dagger}$	$\frac{\alpha_0}{2}$	$-\frac{i\,\alpha_0 k}{\sqrt{2}}$	0	0
$0^{+}f^{\#1}{}^{\dagger}$	$\frac{i\,\alpha_0 k}{\sqrt{2}}$	0	0	0
$0^{+}f^{\#2}{}^{\dagger}$	0	0	0	0
$0^{-}\mathcal{A}^{\#1}{}^{\dagger}$	0	0 0		$\frac{\alpha_0}{2} + 6\,\alpha_1 k^2$

Massive and massless spectra

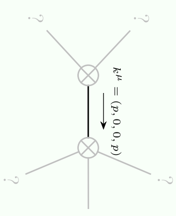
Massive particle

Pole residue:	$-\frac{1}{6\alpha_1} > 0$
Square mass:	$-\frac{\alpha_0}{12\alpha_1} > 0$
Spin:	0
Parity:	Odd



Massless particle

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



Unitarity conditions