Particle spectrograph

Wave operator and propagator

Source constraints		
SO(3) irreps Fundamen $\tau_{0}^{\#2} == 0$ $\partial_{\beta}\partial_{\alpha}\tau^{\alpha\beta} == C$ $\tau_{1}^{\#2}\alpha + 2ik \sigma_{1}^{\#2}\alpha == 0$ $\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau^{\beta\chi} == 0$		
$\tau_{0}^{\#2} == 0$ $\tau_{0}^{\#2} \alpha + 2 i k \sigma_{1}^{\#2} \alpha == 0$ $\tau_{1}^{\#2} \alpha + 2 i k \sigma_{1}^{\#2} \alpha == 0$ $\tau_{1}^{\#2} \alpha + 2 i k \sigma_{1}^{\#2} \alpha == 0$	Fundamental fields	Multiplicities
$\tau_{1}^{\#2}\alpha + 2ik \sigma_{1}^{\#2}\alpha == 0 \partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau^{\beta\chi} == 0$	0 ==	1
	$X == \partial_{X} \partial^{X} \partial_{\beta} t^{\alpha \beta} + 2 \partial_{\delta} \partial^{\delta} \partial_{X} \partial_{\beta} \sigma^{\alpha \beta X}$	8
	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau^{\beta\alpha}$	3
$\tau_1^{\#1}{}^{\alpha\beta} + i k \sigma_1^{\#2}{}^{\alpha\beta} = 0 \left[\partial_\chi \partial^\alpha \tau^{\beta\chi} + \partial_\chi \partial^\beta \tau^{\chi\alpha} + \partial_\chi \partial^\chi \tau^{\alpha\beta} + \partial_\chi \partial^\chi \tau^$	$+\partial_{\chi}\partial^{\beta}\tau^{\chi\alpha}+\partial_{\chi}\partial^{\chi}\tau^{\alpha\beta}+$	(F)
$2 \partial_{\delta} \partial_{\chi} \hat{c}$	$2 \partial_{\delta} \partial_{\chi} \partial^{\alpha} \sigma^{\beta \chi \delta} + 2 \partial_{\delta} \partial^{\delta} \partial_{\chi} \sigma^{\alpha \beta \chi} = =$	
$+ \frac{\partial_{\chi} \partial^{\alpha} \iota^{\chi \beta}}{\partial \varphi}$	$\partial_{\chi}\partial^{\alpha}\tau^{\chi\beta} + \partial_{\chi}\partial^{\beta}\tau^{\alpha\chi} +$	
$\frac{\partial^{\lambda} \chi \partial^{\chi} e^{\zeta}}{\partial x^{\lambda}}$	$\partial_{\chi}\partial^{\chi} t^{\beta\alpha} + 2 \partial_{\delta}\partial_{\chi}\partial^{\beta} \sigma^{\alpha\chi\delta}$	
Total constraints/gauge generators:		10

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$\tau_{1}^{\#2}{}_{\alpha}$	0	0	0	$\frac{2ik}{t_1 + 2k^2t_1}$	$\frac{i\sqrt{2}k}{(1+2k^2)^2t_1}$	0	$\frac{2k^2}{(1+2k^2)^2t_1}$
$\tau_{1^{-}}^{\#1}{}_{\alpha}$	0	0	0	0	0	0	0
$\sigma_{1}^{\#2}{}_{\alpha}$	0	0	0	$\frac{\sqrt{2}}{t_1 + 2k^2t_1}$	$\frac{1}{(1+2k^2)^2t_1}$	0	$-\frac{i\sqrt{2}k}{(1+2k^2)^2t_1}$
$\sigma_{1}^{\#1}{}_{\alpha}$	0	0	0	0	$\frac{\sqrt{2}}{t_1 + 2k^2t_1}$	0	$-\frac{2ik}{t_1+2k^2t_1}$
${\mathfrak r}_1^{\#1}{}_+\alpha\beta$	$-\frac{i\sqrt{2}k}{t_1+k^2t_1}$	$\frac{ik}{(1+k^2)^2t_1}$	$\frac{k^2}{(1+k^2)^2 t_1}$	0	0	0	0
$\sigma_{1}^{\#2}{}_{lphaeta}$	$-\frac{\sqrt{2}}{t_1+k^2t_1}$	$\frac{1}{(1+k^2)^2 t_1}$	$-\frac{ik}{(1+k^2)^2t_1}$	0	0	0	0
$\sigma_{1}^{\#1}{}_{\alpha\beta}$	0	$-\frac{\sqrt{2}}{t_1+k^2t_1}$	$\frac{i\sqrt{2}k}{t_1+k^2t_1}$	0	0	0	0
	β	β;	$\alpha\beta$	ά	Γα	<u>α</u>	α

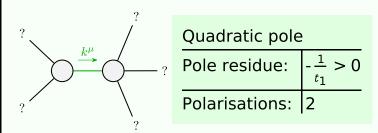
Quadratic (free) action
S==
$\iiint (f^{\alpha\beta} \tau_{\alpha\beta} + \mathcal{A}^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + t_1 (\mathcal{A}_{I\zeta\theta} \mathcal{A}^{I\theta\zeta} + \mathcal{A}^{I\theta}_{I} \mathcal{A}_{\theta\zeta}^{\zeta} + 2 f^{I\theta} \partial_{\theta}\mathcal{A}_{I\zeta}^{\zeta} - 2$
$\partial_{\theta}\mathcal{A}^{\prime\theta}_{\prime}$ - 2 $f^{\prime\theta}$ $\partial_{\zeta}\mathcal{A}_{\prime\theta}^{\zeta}$ +
$2 f' \partial_z \mathcal{A}^{\theta \zeta} (t, x, y, z) dz dy dx dt$

$f_{1}^{\#2}$	0	0	0	ūkt ₁	0	0	0	×					
$f_{1^-}^{\#1}{}_{\alpha}$	0	0	0	0	0	0	0	$\sigma_{2^{-}}^{\#1}{}_{lphaeta\chi}$	0	0	² / _{t1}		
$\mathcal{A}_{1}^{\#^2}{}_{\alpha}$	0	0	0	$\frac{t_1}{\sqrt{2}}$	0	0	0	$\tau_{2}^{\#1}_{\alpha\beta}$	$-\frac{\bar{\ell}\sqrt{2}}{kt_1}$	$-\frac{1}{k^2t_1}$	0		
${\mathcal A}_{1^-}^{\#1}{}_{\alpha}$	0	0	0	- <u>t1</u>	$\frac{t_1}{\sqrt{2}}$	0	$-ikt_1$	$\sigma_{2}^{\#1}{}_{lphaeta}$	0	$\frac{i\sqrt{2}}{kt_1}$	0		
$f_1^{\#1}$	$-\frac{i k t_1}{\sqrt{2}}$	0	0	0	0	0	0		$\sigma_{2}^{\#1} + ^{\alpha\beta}$	$\tau_2^{\#1} + \alpha\beta$	$\sigma_{2}^{*1} +^{lphaeta\chi}$		
${\mathcal A}_1^{\#_2^2}$	$-\frac{t_1}{\sqrt{2}}$	0	0	0	0	0	0		<i>"</i> b"	$\mathcal{A}_{2}^{\sharp 1}$		$_{3}\mathcal{A}_{2}^{\sharp1}{}_{lphaeta\chi}$	
$\mathcal{A}_{1}^{\#1}{}_{\alpha\beta}$	$-\frac{t_1}{2}$	$-\frac{t_1}{\sqrt{2}}$	$\frac{i k t_1}{\sqrt{2}}$	0	0	0	0	${\cal F}\!\!\!/_2^{\!\!\!\!/}$		<u>t</u> 1 2	$-\frac{ikt_1}{\sqrt{2}}$	0	
, ,	$+\alpha\beta$	$+^{\alpha\beta}$	$+_{\alpha\beta}$. +α	± +α	$f_{1}^{\#1} \dagger^{lpha}$	$f_{1}^{\#2} +^{\alpha}$	$f_2^{\#}$	$^{\dagger 1}_{+}$ † $^{\alpha\beta}$	$\frac{i k t_1}{\sqrt{2}}$	0	0	
	$\mathcal{A}_{1}^{\#1} \dagger^{\alpha\beta}$	#2.	$f_{1}^{\#1} \dagger^{\alpha\beta}$	$\mathcal{A}_1^{\sharp_1} \dagger^{\alpha}$	$\mathcal{A}_1^{\#2}$.	$f_{1}^{\#1}$	$f_{1}^{#2}$	$\mathcal{A}_2^{\#_2^2}$	1 $^{\alpha \beta \chi}$	0	0	$\frac{t_1}{2}$	

σ_{0}^{t2} $\sigma_{0}^{\#1}$	0 (0 0				1	$\begin{vmatrix} -t_1 \end{vmatrix}$	
$\tau_0^{\#2}$					0		0	
$\tau_0^{\#1}$	1 1/2 kt1	$\frac{i}{\sqrt{2} kt_1}$		2 k² t ₁		0		
$\sigma_{0}^{\#1}$	0	<u> </u>	$\sqrt{2} kt_1$	U	>	•	0	
·	$\sigma_{0}^{\#1}$ †	$\tau_{*+}^{#1}$. 0	r#2 +	, +0	#	$\sigma_{0}^{\#^{\perp}}$ \pm	
${\mathscr A}_{0^{\text{-}}}^{\#1}$	0	0	C	0	+	-61		
$f_0^{\#2}$	0	0	C	0	O	0		
$f_{0}^{\#1}$	$i\sqrt{2}kt_1$	0	Û	0	O	0		
$\mathcal{A}_{0}^{\#1}$	-t ₁	$-i\sqrt{2}kt_1$	c	0	c	0		

 $\mathcal{A}_{0}^{\#1}$ $f_{0}^{\#1}$ $f_{0}^{\#2}$

Massive and massless spectra



(No massive particles)

Unitarity conditions