

# Particle spectrograph

## Wave operator and propagator

xAct`PSALTER`Private`GraphicsCollage[

$\omega_{0+}^{\#1}$  $f_{0+}^{\#1}$  $f_{0+}^{\#2}$  $\omega_{0-}^{\#1}$

$\omega_{0+}^{\#1} \dagger$	$6 k^2 r_3$	0	0	0
$f_{0+}^{\#1} \dagger$	0	0	0	0
$f_{0+}^{\#2} \dagger$	0	0	0	0
$\omega_{0-}^{\#1} \dagger$	0	0	0	$k^2 r_2 + t_2$

$\omega_{1+}^{\#1} \alpha \beta$  $\omega_{1+}^{\#2} \alpha \beta$  $f_{1+}^{\#1} \alpha \beta$  $\omega_{1-}^{\#1} \alpha$  $\omega_{1-}^{\#2} \alpha$  $f_{1-}^{\#1} \alpha$  $f_{1-}^{\#2} \alpha$

$\omega_{1+}^{\#1} \dagger \alpha \beta$	$\frac{2 t_2}{3}$	$\frac{\sqrt{2} t_2}{3}$	$\frac{1}{3} i \sqrt{2} k t_2$	0	0	0	0
$\omega_{1+}^{\#2} \dagger \alpha \beta$	$\frac{\sqrt{2} t_2}{3}$	$\frac{t_2}{3}$	$\frac{i k t_2}{3}$	0	0	0	0
$f_{1+}^{\#1} \dagger \alpha \beta$	$-\frac{1}{3} i \sqrt{2} k t_2$	$-\frac{1}{3} i k t_2$	$\frac{k^2 t_2}{3}$	0	0	0	0
$\omega_{1-}^{\#1} \dagger \alpha$	0	0	0	0	0	0	0
$\omega_{1-}^{\#2} \dagger \alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#1} \dagger \alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#2} \dagger \alpha$	0	0	0	0	0	0	0

$\omega_{2+}^{\#1} \alpha \beta$  $f_{2+}^{\#1} \alpha \beta$  $\omega_{2-}^{\#1} \alpha \beta \chi$

$\omega_{2+}^{\#1} \dagger \alpha \beta$	0	0	0
$f_{2+}^{\#1} \dagger \alpha \beta$	0	0	0
$\omega_{2-}^{\#1} \dagger \alpha \beta \chi$	0	0	0

{AspectRatio → Automatic}],

Join[548, {AspectRatio → Automatic}, {Null, Null}, {500}]]

## Massive and massless spectra

xAct`PSALTER`Private`GraphicsCollage[{Null, Null},

Join[548, {AspectRatio → Automatic}, {Null, Null}, {500}]]

## Unitarity conditions

