Particle spectrograph

Wave operator and propagator
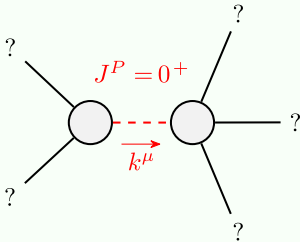
Quadratic (free) action

$$\mathcal{S} == \iiiint (\phi\,(-\beta\,\phi + \rho) + \alpha\,\partial_\alpha \phi\,\partial^\alpha \phi)[t, x, y, z]\,dz\,dy\,dx\,dt$$

(No source constraints)

	$\phi_{0^+}^{\#1}$		$\rho_{0^+}^{\#1}$
$\phi_{0^+}^{\#1}$ †	$-\beta + \alpha\,k^2$	$\rho_{0^+}^{\#1}$ †	$\dfrac{1}{-\beta + \alpha\,k^2}$

Massive and massless spectra

$J^P = 0^+$

$\overrightarrow{k^\mu}$

Massive particle	
Pole residue:	$\dfrac{1}{\alpha} > 0$
Polarisations:	1
Square mass:	$\dfrac{\beta}{\alpha} > 0$
Spin:	0
Parity:	Even

(No massless particles)

Unitarity conditions

$\alpha > 0 \;\&\&\; \beta > 0$