Particle spectrograph

Wave operator and propagator

Quadratic (free) action

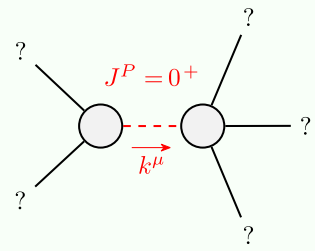
$$\mathcal{S}_{\mathrm{F}} == \int\int\int\int (\phi\,(-\beta\,\phi + \rho) + \alpha\,\partial_{\alpha}\phi\,\partial^{\alpha}\phi)[t,\, x,\, y,\, z]\,dz\,dy\,dx\,dt$$

$$\phi_{0^+}^{\#1} \dagger \boxed{-\beta + \alpha\,k^2} \phi_{0^+}^{\#1}$$

$$\rho_{0^+}^{\#1} \dagger \boxed{\frac{1}{-\beta + \alpha\,k^2}} \rho_{0^+}^{\#1}$$

(No source constraints)

Massive and massless spectra



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

(No massless particles)

Unitarity conditions

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