Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$$\mathcal{S}_{\mathsf{F}} == \iiint\!\!\int (\gamma\, \mathcal{B}_\alpha\, \mathcal{B}^\alpha + \mathcal{B}^\alpha\, \mathcal{J}_\alpha + \beta\, \partial_\alpha \mathcal{B}^\alpha\, \partial_\beta \mathcal{B}^\beta)[t, x, y, z]\, dz\, dy\, dx\, dt$$

$\mathcal{J}_{1^-}^{\#1} + \alpha$ $\boxed{\dfrac{1}{\gamma}}$ $\mathcal{J}_{1^-}^{\#1} \alpha$
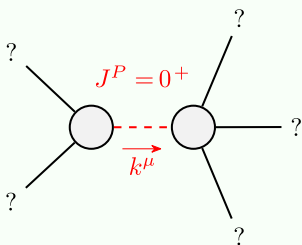
$\mathcal{J}_{0^+}^{\#1} +$ $\boxed{\dfrac{1}{\gamma + \beta k^2}}$ $\mathcal{J}_{0^+}^{\#1}$

$\mathcal{B}_{1^-}^{\#1} + \alpha$ $\boxed{\gamma}$ $\mathcal{B}_{1^-}^{\#1}\, \alpha$

$\mathcal{B}_{0^+}^{\#1} +$ $\boxed{\gamma + \beta k^2}$ $\mathcal{B}_{0^+}^{\#1}$

(No source constraints)

Massive and massless spectra

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

(No massless particles)

Unitarity conditions

$\beta > 0$ && $\gamma < 0$