Particle spectrograph

Wave operator and propagator

$\mathcal{S}$ ==

$$\iiiint \Big(\tfrac{1}{2}\big(-\mu^2\,\phi0^2\,\varphi^2 + \nu\,\phi0^2\,\mathcal{B}_\alpha\,\mathcal{B}^\alpha + 2\,\phi\,\rho + 2\,\varphi\,\varrho + \mathcal{B}^\alpha\,(2\,\mathcal{J}_\alpha - 2\,\nu\,\phi0\,\partial_\alpha\phi - \phi0\,\sigma\,\partial_\alpha\varphi) + \nu\,\partial_\alpha\phi\,\partial^\alpha\phi + \sigma\,\partial_\alpha\varphi\,\partial^\alpha\phi + \partial_\alpha\varphi\,\partial^\alpha\varphi + \xi\,\partial_\alpha\mathcal{B}_\beta\,\partial^\beta\mathcal{B}^\alpha - \xi\,\partial_\beta\mathcal{B}_\alpha\,\partial^\beta\mathcal{B}^\alpha\big)\Big)[t,x,y,z]\,dz\,dy\,dx\,dt$$

	$^{\#1}0^{+}\varrho$	$^{\#1}0^{+}\rho$	$^{\#1}0^{+}\mathcal{J}$
$^{\#1}0^{+}\mathcal{J}^\dagger$	$-\frac{4 i\,\phi0\,\sigma\,k}{(\phi0^2+k^2)(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$	$-\frac{8 i\,\phi0(\mu\,\phi0-k)k(\mu\,\phi0+k)}{(\phi0^2+k^2)^2(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$	$\frac{8\,\phi0^2(\mu\,\phi0-k)(\mu\,\phi0+k)}{(\phi0^2+k^2)^2(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$
$^{\#1}0^{+}\rho^\dagger$	$\frac{4\,\sigma\,k^2}{(\phi0^2+k^2)(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$	$\frac{8(\mu\,\phi0-k)k^2(\mu\,\phi0+k)}{(\phi0^2+k^2)^2(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$	$\frac{8 i\,\phi0(\mu\,\phi0-k)k(\mu\,\phi0+k)}{(\phi0^2+k^2)^2(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$
$^{\#1}0^{+}\varrho^\dagger$	$-\frac{8\,\nu}{4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2}$	$\frac{4\,\sigma\,k^2}{(\phi0^2+k^2)(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$	$\frac{4 i\,\phi0\,\sigma\,k}{(\phi0^2+k^2)(4\mu^2\nu\,\phi0^2+(-4\nu+\sigma^2)k^2)}$

	$^{\#1}1^{-}\mathcal{B}_\alpha$
$^{\#1}1^{-}\mathcal{B}^{\dagger\alpha}$	$\frac{1}{2}(\nu\,\phi0^2-\xi\,k^2)$

	$^{\#1}1^{-}\mathcal{J}_\alpha$
$^{\#1}1^{-}\mathcal{J}^{\dagger\alpha}$	$\frac{2}{\nu\,\phi0^2-\xi\,k^2}$

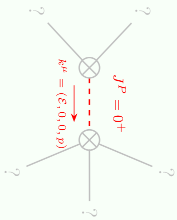
Spin-parity form	Covariant form	Multiplicities
$\phi0\,0^{+\,\#1}\rho - i\,k\,0^{+\,\#1}\mathcal{J}$ == 0	$\phi0\,\rho$ == $\partial_\alpha\mathcal{J}^\alpha$	1
Total expected gauge generators:		1

	$^{\#1}0^{+}\varphi$	$^{\#1}0^{+}\phi$	$^{\#1}0^{+}\mathcal{B}$
$^{\#1}0^{+}\mathcal{B}^\dagger$	$-\frac{1}{4} i\,\phi0\,\sigma\,k$	$-\frac{1}{2} i\,\nu\,\phi0\,k$	$\frac{\nu\,\phi0^2}{2}$
$^{\#1}0^{+}\phi^\dagger$	$\frac{\sigma\,k^2}{4}$	$\frac{\nu\,k^2}{2}$	$\frac{1}{2} i\,\nu\,\phi0\,k$
$^{\#1}0^{+}\varphi^\dagger$	$\frac{1}{2}(-\mu^2\,\phi0^2+k^2)$	$\frac{\sigma\,k^2}{4}$	$\frac{1}{4} i\,\phi0\,\sigma\,k$

Massive and massless spectra

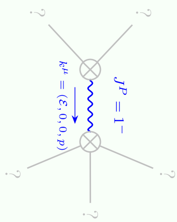
Massive particle

Pole residue:	$\frac{8(1+\mu^2)}{4(1+\mu^2)\nu-\sigma^2} > 0$
Square mass:	$-\phi0^2 > 0$
Spin:	0
Parity:	Even



Massive particle

Pole residue:	$\frac{2}{\xi} > 0$
Square mass:	$\frac{\nu\,\phi0^2}{\xi} > 0$
Spin:	1
Parity:	Odd



(No particles)

Unitarity conditions