Particle spectrograph

Wave operator and propagator

Quadratic (free) action

$$S_F == \iiint \big[\tfrac{1}{6}(-2(t_1 - 2t_3)\,\omega_i{}^{\alpha i}\,\omega_i{}^{\kappa}{}_{\kappa\lambda} - 6t_1\,\omega_i{}^{\kappa\lambda}\,\omega_{\kappa\lambda}{}^i + 6f^{\alpha\beta}\tau_{\alpha\beta} + 6\,\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi} + \cdots)\big][t,x,y,z]\,dz\,dy\,dx\,dt$$

This page consists of a large scientific figure ("Particle spectrograph") containing the quadratic free action, several wave-operator/propagator matrices, and source-constraint tables.

Source constraints/gauge generators

SO(3) irreps	Multiplicities
$\tau_{0^+}^{\#2} == 0$	1
$\tau_{0^+}^{\#1} - 2\,i\,k\,\sigma_{0^+}^{\#1} == 0$	1
$\tau_{1^-}^{\#2\,\alpha} + 2\,i\,k\,\sigma_{1^-}^{\#2\,\alpha} == 0$	3
$\tau_{1^-}^{\#1\,\alpha} == 0$	3
$\tau_{1^+}^{\#1\,\alpha\beta} + i\,k\,\sigma_{1^+}^{\#2\,\alpha\beta} == 0$	3
$\tau_{2^+}^{\#1\,\alpha\beta} - 2\,i\,k\,\sigma_{2^+}^{\#1\,\alpha\beta} == 0$	5
Total constraints:	16

Massive and massless spectra

Massive particle

Pole residue:	$-\dfrac{1}{r_1} > 0$
Polarisations:	5
Square mass:	$-\dfrac{t_1}{2\,r_1} > 0$
Spin:	2
Parity:	Odd

(No massless particles)

Unitarity conditions

$r_1 < 0 \ \&\& \ t_1 > 0$