'Conformal' Symmetry

'space-time dilation'

$$x^\mu \to x^{\mu\prime} = \lambda x^\mu$$

quantum fields scale as:

$$\phi(x) \to \phi'(x) = \lambda^d \phi(\lambda x)$$

$d = 3/2$ for fermions

$d = 1$ for vector bosons

field theory is 'scale invariant' if

$$S' = \int d^4x \mathcal{L}'(x) = \int d^4x \lambda^4 \mathcal{L}(\lambda x) = S$$

conserved current:

$$\mathcal{D}^\mu = x_\nu T^{\mu\nu}; \quad \partial_\mu \mathcal{D}^\mu = T^\mu_\mu = 0$$

massless classical QCD is scale invariant !