2022-11-17

Transformation de Jauge

...

Action de la QCD

$$
\begin{aligned}
F \overbrace{=}^{?} & \partial_\mu A_\nu - \partial_\nu A_\mu \\
& = \mathcal{D}_\mu A_\nu \mathcal{D}_\nu \\
& = (del_\mu igA_\mu)\, A_\nu - (\partial_\nu + igA_\nu)\, A_\mu \\
& = \partial_\mu A_\nu - \partial_\nu A_\mu + ig[A_\mu, A_\nu]
\end{aligned}
$$

$$
\begin{aligned}
F'_{\mu\nu} &= \mathcal{D}'_\mu A'_\nu - \mathcal{D}'_\nu A'_\mu \\
&= \cdots \\
&= U F_{\mu\nu} U^\dagger
\end{aligned}
$$

$$
\boxed{F^a_{\mu\nu} = \partial_\mu A^a_\nu - \partial_\mu A^a_\mu - f_{bca} A^b_\mu A^c_\nu}
$$

$$
L_{QCD} = \frac{1}{2}\,\mathrm{tr}(F_{\mu\nu}) F_{\mu\nu} = \cdots = -\frac{1}{4} F^a_{\mu\nu} F^{\mu\nu a}
$$