

場の量子論 p256check9.10

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$$[\mathcal{L}] = 4 \quad (1)$$

$$\mathcal{L} = \bar{\psi}[i\gamma^\mu(\partial_\mu + iqA_\mu) - m]\psi \quad (2)$$

$$[\bar{\psi}\psi] = 3 \quad (3)$$

$$[\bar{\psi}] = [\psi] = \frac{3}{2} \quad (4)$$

$$[A_\mu] = 1 \quad (5)$$

$$\eta_{\mu\nu}\sigma^{\mu\nu} = \eta_{\mu\nu}\frac{i}{2}[\gamma^\mu, \gamma^\nu] \quad (6)$$

$$= \frac{i}{2}\eta_{\mu\nu}(\gamma^\mu\gamma^\nu - \gamma^\nu\gamma^\mu) \quad (7)$$

$$= \frac{i}{2}(\eta_{\mu\nu}\gamma^\mu\gamma^\nu - \eta_{\mu\nu}\gamma^\nu\gamma^\mu) \quad (8)$$

$$= \frac{i}{2}(\eta_{\mu\nu}\gamma^\mu\gamma^\nu - \eta_{\nu\mu}\gamma^\nu\gamma^\mu) \quad (9)$$

$$= \frac{i}{2}(\eta_{\mu\nu}\gamma^\mu\gamma^\nu - \eta_{\mu\nu}\gamma^\mu\gamma^\nu) \quad (10)$$

$$= 0 \quad (11)$$

参考文献

- [1] 坂本眞人著「場の量子論-不変性と自由場を中心にして」(裳華房,2014,ISBN9784785325114)