

場の量子論 p173check6.10

谷脇 貞善

2023 年 12 月 18 日

1 本文

$$\bar{\psi}_L \psi_R + \bar{\psi}_R \psi_L = \bar{\psi} P_R P_R \psi + \bar{\psi} P_L P_L \psi = \bar{\psi} P_R \psi + \bar{\psi} P_L \psi = \bar{\psi} \psi \quad (1)$$

$$\bar{\psi}_R \gamma^\mu \psi_R + \bar{\psi}_L \gamma^\mu \psi_L = \bar{\psi} P_R \gamma^\mu P_R \psi + \bar{\psi} P_L \gamma^\mu P_L \psi \quad (2)$$

$$= \bar{\psi} P_L P_L \gamma^\mu \psi + \bar{\psi} P_R P_R \gamma^\mu \psi = \bar{\psi} P_L \gamma^\mu \psi + \bar{\psi} P_R \gamma^\mu \psi = \bar{\psi} \gamma^\mu \psi \quad (3)$$

$$\bar{\psi}_L \sigma^{\mu\nu} \psi_R + \bar{\psi}_R \sigma^{\mu\nu} \psi_L = \bar{\psi} P_R \sigma^{\mu\nu} P_R \psi + \bar{\psi} P_L \sigma^{\mu\nu} P_L \psi \quad (4)$$

$$= \bar{\psi} P_R P_R \sigma^{\mu\nu} \psi + \bar{\psi} P_L P_L \sigma^{\mu\nu} \psi = \bar{\psi} P_R \sigma^{\mu\nu} \psi + \bar{\psi} P_L \sigma^{\mu\nu} \psi = \bar{\psi} \sigma^{\mu\nu} \psi \quad (5)$$

$$\bar{\psi}_L \gamma^5 \psi_R + \bar{\psi}_R \gamma^5 \psi_L = \bar{\psi} P_R \gamma^5 P_R \psi + \bar{\psi} P_L \gamma^5 P_L \psi \quad (6)$$

$$= \bar{\psi} P_R P_R \gamma^5 \psi + \bar{\psi} P_L P_L \gamma^5 \psi = \bar{\psi} P_R \gamma^5 \psi + \bar{\psi} P_L \gamma^5 \psi = \bar{\psi} \gamma^5 \psi \quad (7)$$

$$\bar{\psi}_R \gamma^\mu \gamma^5 \psi_R + \bar{\psi}_L \gamma^\mu \gamma^5 \psi_L = \bar{\psi} P_R \gamma^\mu \gamma^5 P_R \psi + \bar{\psi} P_L \gamma^\mu \gamma^5 P_L \psi \quad (8)$$

$$= \bar{\psi} P_L P_L \gamma^\mu \gamma^5 \psi + \bar{\psi} P_R P_R \gamma^\mu \gamma^5 \psi = \bar{\psi} P_L \gamma^\mu \gamma^5 \psi + \bar{\psi} P_R \gamma^\mu \gamma^5 \psi = \bar{\psi} \gamma^\mu \gamma^5 \psi \quad (9)$$

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)