Questions 18th April 2017

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The Weak Interaction

1) What is Parity and why do we care?

2) Discuss some of the similarities behind QED and QCD (think of their interactions)

3) From the QED process of $e^- q \to e^- q$, show that parity is conserved.

3i) What does this imply about the QCD interaction?

4) What was the first experimental evidence of parity violation in the weak interaction?

5) Explain why the strong decay $\rho^0 \to \pi^- \pi^+$ is observed, but the strong decay $\rho^0 \to \pi^0 \pi^0$ is not.

6) In the annihiliation process $e^+ e^- \to q\bar{q}$, the QED vector interaction leads to non-zero matrix elements only for the chiral combinations LR $\to$ LR, LR $\to$ RL, RL $\to$ RL, RL $\to$ LR. What are the corresponding allowed chiral combinations for S, P and S - P interactions?