

Physics 125 Problem Set 3

Harry Nelson

due Friday, April 17 in class

1. Look a bit into charged lepton number violation in this problem.
 - (a) Using the vertices described in class, draw a complicated but allowed Feynman diagram for the process $\mu^- \rightarrow e^- \gamma$, where the lepton number of the charged fermions would be violated. Hint: draw an intermediate state of a neutrino line and a W line.
 - (b) Look up the limits on the branching ratios for the 3 processes $\mu^- \rightarrow e^- \gamma$, $\tau^- \rightarrow e^- \gamma$, and $\tau^- \rightarrow \mu^- \gamma$.
 - (c) Draw a candidate diagram for the annihilation of a μ^- and a e^+ through a photon (and nothing else) Is the amplitude non-zero or zero, and why?
 2. Griffiths, 2.2
 3. Griffiths 2.5
 4. Griffiths 2.7
 5. Griffiths 2.12
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