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Proposal 1:(Neutrino oscillations) In neutrinos mass eigenstates do not coincide with interaction eigenstates so they do oscillate. But wait... in the quark sector, mass eigenstates are not interaction eigenstates either, we all know the CKM matrix.

i) So why they do not oscillate, or they do ?

ii) Can we see quark oscillations ?

iii) so when can we see oscillations ?

Proposal 2: (Majorana or Dirac) We all know $\pi^+ \longrightarrow \nu_\mu \;\; \mu^+$

(by the way why not $\pi^+ \longrightarrow \nu_e \;\; e^+$).

i) Calculate the momentum of the daughter particles in the pion rest frame.

ii) Now make a boost to the pion (lab frame) so that every particle moves forward. What is the pion energy in this frame (the lab frame)

iii) Now, lets make the boosted pion decay in flight and its neutrinos hit a target. If (the now) right handed neutrino is also a left handed antineutrino, we will start producing wrong sign muons (easy right?). Suppose we do it, what is the fraction that get helicity flipped ?