

Abstract Submitted  
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**Vector Pion Model and the Pion-Muon Decay Asymmetry** WALTON PERKINS, Perkins Advanced Computer Systems — From the pion-muon asymmetry experiments of the 1950's and 1960's, there is significant evidence that pions can carry a direction. There is also solid evidence that the spin of the pion is zero. These two sets of evidence are not necessarily mutually exclusive. Along the lines of Yukawa's original ideas, we consider a pion-photon model with both being composite particles formed from the same fermions and antifermions. In this model the pion is an helicity-0 vector particle with longitudinal polarization. If such pions are created by protons impinging on a low- $Z$  target, theory predicts that they will be almost completely polarized along the direction of the proton beam. Indeed, the pion-muon asymmetry experiments showed a longitudinal polarization along the direction of the proton beam. Since an helicity-0 vector pion has no magnetic moment, the direction of its polarization relative to its momentum can be changed by bending it in a magnetic field, leading to an experiment that can prove that the pion is not a pseudoscalar particle. See W. A. Perkins, "Pion-Muon Asymmetry Revisited," <http://arXiv.org/hep-ph/0807.3182v1> (2008).

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