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Vectorlike leptons and long-lived bosons at the LHC

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Long-lived particles are a prime target of searches in current and upcoming LHC runs. In my talk, I will discuss a renormalizable theory that includes a heavy weak-singlet vectorlike lepton that decays into a long-lived pseudoscalar boson and a tau lepton. I will show that this can be the dominant decay mode of the vectorlike lepton provided the pseudoscalar couplings deviate from the case of a Nambu-Goldstone boson. The electroweak production of vectorlike leptons leads to a rich phenomenology at colliders, including signals with many taus or photons. I will analyze in detail the case where the pseudoscalar has a decay length of a few meters and thus would typically deposit energy in the muon chambers of the CMS or ATLAS detectors.

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