

James T. Linnemann – HEP Seminar 2/18/2020
MSU

Constraining Lorentz Invariance Violation with HAWC

We have recently improved the energy estimation algorithm for photons observed by HAWC, the High Altitude Water Cherenkov gamma ray observatory sited in Mexico. This has enabled HAWC to follow spectra of astrophysical sources out to photon energies above 100 TeV. I'll explain our energy estimation methods and some of our gamma-hadron separation methods, and show photon spectra for several high-energy sources. I will also introduce the exotic physics possible if Lorentz Invariance is violated at high energies. It turns out that simply observing very high energy photons allows us to place strong constraints on the energy scale of Lorentz Invariance violation. As a result of our recent data, we have improved some of these limits by as much as 2 orders of magnitude.