APR16-2016-000520

Abstract for an Invited Paper
for the APR16 Meeting of
the American Physical Society

Tests of new physics with astrophysical neutrinos

MAURICIO BUSTAMANTE, Center for Cosmology and Astroparticle Physics, The Ohio State University

Neutrino telescopes have started to prove their value as instruments for precision particle physics. High-energy astrophysical neutrinos, recently discovered by IceCube, provide an opportunity to look for new physics at previously unexplored energies – from tens of TeV to a few PeV, far beyond the reach of laboratory experiments. Because of cosmological-scale baselines – Mpc to Gpc – tiny new physics effects, otherwise unobservable, could accumulate up to observable levels. Effects include, for instance, neutrino decay, violation of fundamental symmetries, and exotic neutrino-neutrino interactions. I will show that the flavor composition and spectrum of neutrinos may reveal the presence of new physics and its type. Present-day data – tens of astrophysical neutrino events – are already sensitive to some of them. More statistics, improvements in detection techniques, and future detector upgrades will improve the sensitivity.