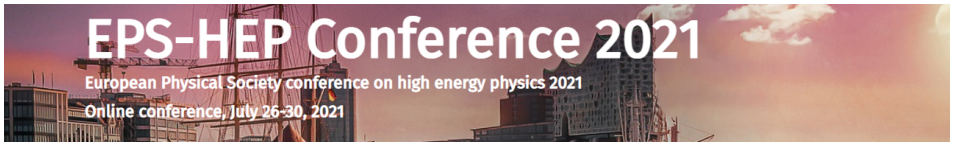

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Non-standard neutrino interactions in IceCube

Tuesday, 27 July 2021 16:20 (20 minutes)

Non-standard neutrino interactions (NSI) arise in various types of new physics. Their existence would change the potential that atmospheric neutrinos encounter when traversing Earth matter and hence alter their oscillation behavior. This imprint on coherent neutrino forward scattering can be probed using high-statistics neutrino experiments such as IceCube and its low-energy extension, DeepCore. Both provide extensive data samples that include all neutrino flavors, with oscillation baselines between tens of kilometers and the Earth diameter.
For DeepCore data samples, event energies reach from few GeV up to the order of 100 GeV - which marks the lower threshold for higher energy IceCube samples, ranging up to 10 TeV.
In DeepCore data the large sample size and energy range allow us to consider not only flavor-violating and -nonuniversal NSI in the $\mu - \tau$ sector, but also those involving the electron flavor.
The effective parameterization used in our analyses is independent of the underlying model and the new physics mass scale. In this way, competitive limits on several NSI parameters have been set in the past. The 8 years of data available now result in significantly improved sensitivities. This improvement stems not only from the increase in statistics but also from substantial improvement in the treatment of systematic uncertainties, background rejection and event reconstruction.

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