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Search for non-standard interactions in neutrino propagation with IceCube (DeepCore)

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In order to understand the mechanism that creates the observed small neutrino masses, physics beyond the Standard Model may be required. Indeed, many neutrino mass models give rise to non-standard neutrino interactions (NSI), which are therefore theoretically well motivated. Neutrino oscillation experiments are able to probe NSI in neutrino propagation via a model-independent low-energy effective approach, which is valid no matter at which mass scale the new physics occurs. The IceCube neutrino detector and its low-energy extension DeepCore collect large data samples of atmospheric neutrinos whose oscillations carry the imprint of neutrino coherent forward scattering in Earth matter. In the presence of NSI, both flavour-diagonal and flavour-changing neutral-current transitions lead to a generalised matter potential that IceCube is able to constrain. This talk will present the status of NSI searches at IceCube, with a focus on the results of a new analysis using a three-year all-flavour data sample from IceCube DeepCore.

Summary

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