Particle Physics on the Plains 2024



Contribution ID: 34

Type: not specified

Probing Scalar Non-Standard Interactions via Flavor Composition of Astrophysical Neutrinos

Saturday 2 November 2024 12:11 (18 minutes)

Scalar Non-Standard interaction(SNSI) of neutrinos contribute as modifications to the neutrino mass matrix in the oscillation Hamiltonan and can induce a small active-sterile mass splitting via a Majorana-type interaction due to the matter effect. This framework leads to pseudo-Dirac behavior of neutrinos, introducing rich phenomenology in neutrino oscillations, particularly for high-energy astrophysical neutrinos. The matter effect due to SNSI would affect the flavor ratios predictions from the high-energy astrophysical neutrinos when compared to the standard oscillation flavor ratio measurements which depends on the physical processes occurring in the sources(pion decay chain , muon damped pion decay etc). In this work we use the flavor modifications of astrophysical neutrinos as a probe of scalar NSI, comparing with the existing flavor ratio constraints from IceCube and with projections for next-generation neutrino telescopes like IceCube-Gen2. The results excluded from this flavor analysis are then translated back onto model parameters i.e. yukawa couplings and mass allowing us to place new constraints on the parameter space for light scalar NSI.

Authors: VERMA, Ankur; Prof. DUTTA, Bhaskar; DEV, Bhupal (Washington University in St. Louis); MAR-TINEZ SOLER, IVAN (Durham University and IPPP)

Presenter: VERMA, Ankur

Session Classification: Neutrino Physics and Astrophysics 2