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Matter Effect on the Flavor Composition of Astrophysical Neutrinos

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The sources of the high-energy neutrino events detected by IceCube remain largely unknown. A more precise neutrino flavor ratio measurement in the future will be crucial in resolving this open question. We discuss how the flavor ratio gets modified in presence of matter effects for Active Galactic Nuclei (AGNs) which are currently the most promising astrophysical candidate sources. We show that the matter effect provides a unique probe of heavily Compton-thick AGNs which escape conventional detection in electromagnetic wavelengths. Finally, we will briefly talk about the matter effect induced by the relic neutrino background on the flavor composition.

Author: DEV, Bhupal (Washington University in St. Louis)

Presenter: DEV, Bhupal (Washington University in St. Louis)

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