Contribution ID: **976** Type: **Oral**

Energy-dependent flavor ratios, cascade/track spectrum tension and high-energy neutrinos from magnetospheres of supermassive black holes

Wednesday, 26 October 2022 15:30 (15 minutes)

The IceCube neutrino observatory measures the diffuse flux of high-energy astrophysical neutrinos by means of various techniques, and there exists a mild tension between spectra obtained in different analyses. The spectrum derived from reconstruction of muon tracks is harder than that from cascades, dominated by electron and tau neutrinos. If confirmed, this tension may provide a clue to the origin of these neutrinos, which remains uncertain. Here we investigate the possibility that this tension may be caused by the change of the flavor content of astrophysical neutrinos with energy. We assume that at higher energies, the flux contains more muon neutrinos than expected in the usually assumed flavor equipartition. This may happen if the neutrinos are produced in regions of the magnetic field so strong that muons, born in pi-meson decays, cool by synchrotron radiation faster than decay. The magnetic field of ~10^4G is required for this mechanism to be relevant for the IceCube results. We note that these field values are reachable in the immediate vicinity of supermassive black holes in active galactic nuclei and present a working toy model of the population of these potential neutrino sources. While this model predicts the required flavor ratios and describes the high-energy spectrum, it needs an additional component to explain the observed neutrino flux at lower energies.

Primary author: RIABTSEV, Kirill (Moscow State University)

Presenter: RIABTSEV, Kirill (Moscow State University)

Session Classification: Theoretical Physics

Track Classification: Theoretical Physics