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Are Hot-Coronae of Seyfert Galaxies truly emitters of High-Energy Neutrinos and Cosmic-Rays?

The IceCube Collaboration has recently reported compelling evidence of high energy neutrino emission from NGC 1068, and mild excesses for other 3 local Seyfert galaxies. This sparked a surge of interest in neutrino emissions from the hot coronae around supermassive black holes in Seyfert galaxies. In this talk, I demonstrate that these sources are consistent with sub-equipartition between Cosmic rays (CRs) and the magnetic energy densities. Nonetheless, the energetics carried by CRs is rather high, making future analyses fundamental to investigate if such conditions can be met in the environment of Seyfert galaxies. I will estimate the neutrino flux of whole Seyfert population, and I will demonstrate that it might overestimate the diffuse neutrino flux at 1-10 TeV energies leading to a potential tension in the high-energy neutrino sky. Therefore, not all the AGNs might be neutrino emitters and potentially the IceCube diffuse flux might be dominated by a very local population of Active Galactic Nuclei (AGNs). This will give me also the opportunity to study the potential connection between hot coronae and Ultra-High-Energy Cosmic Rays (UHECRs), quantifying if the correlation between Starburst Galaxies and the Pierre Auger Observatory (PAO) data might be due to the hot coronae activities in these sources. Finally, I will apply my findings to the Multi-PeV event discovered by the KM3NeT/ARCA detector and discuss the role of hot coronae.

Collaboration(s)

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