IceCube Neutrinos from Hadronically Powered Gamma-Ray Galaxies

It is commonly believed that sources in which the proton-proton interaction dominates cannot give an important contribution to the flux of high energy neutrinos. In this talk I will use the multi-messenger analysis to re-evaluate this contribution, in order to determine if the high energy diffuse neutrino flux observed by the IceCube Observatory can originate from gamma-ray sources powered by Cosmic Rays interactions with gas. Typical representatives of such sources are Starburst and Ultra-Luminous Infrared Galaxies. Using the three most recent calculations of the non-blazar contribution to the extragalactic gamma-ray background measured by the Fermi-LAT collaboration, we find that a hard power-law spectrum is compatible with all the estimations for the allowed contribution from non-blazar sources, within 1 sigma. Using such a spectrum we are able to interpret the IceCube results, showing that various classes of hadronically powered gamma-ray galaxies can provide the dominant contribution to the astrophysical signal. With the addition of neutrinos from the Galactic plane, it is possible to saturate the IceCube signal. Our result reverses previous findings in which evidence was claimed against hadronic sources being the dominant source of IceCube neutrinos.