Contribution ID: **154** Type: **not specified**

Exploring High-Energy Neutrino Sources: A Comprehensive Analysis

Friday 13 December 2024 16:41 (17 minutes)

The sources of high-energy astrophysical neutrino events are still unknown. We searched sources at an angular separation of 3 degrees from the neutrino event positions. out of 340 high energy astrophysical neutrinos, 262 were found to coincide with the positions of the blazar sources. The coincident number of blazar sources is 460. Nine of these sources had a maximum of four neutrino events around them. From light curve follow up observations, we investigated whether these neutrino events originated from these sources. Among nine sources, the source 4FGL J1012.3+0629 was in the most flaring state during the detection time of the neutrino events. In the sources 4FGL J2226.8+0051 and 4FGL J2227.9+0036, we observe higher photon flux in the vicinity of the neutrino events. In sources 4FGL J1016.0+0512, 4FGL J1018.4+0528, 4FGL J0506.9+0323, 4FGL J2223.3+0102 and 4FGL J2252.6+1245, there is no sign of flaring activity during the neutrino event detection time. Our study showed that the sources 4FGL J1012.3+0629, 4FGL J2118.0+0019, 4FGL J2226.8+0051 and 4FGL J2227.9+0036 as a high energy plausible neutrino sources.

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Session Classification: Parallel Session