Contribution ID: **161** Type: **not specified**

Development of a new IceCube realtime alert using multiplet signal for optical follow-up

Wednesday, September 13, 2023 5:25 PM (15 minutes)

Multimessenger observation of neutrino sources is a key for identifying the origin of astrophysical neutrinos, and it led to the identification of the blazar TXS 0506+056 as the first candidate in 2017. When the IceCube observatory detects likey astrophysical neutrino events, alerts are sent to the other telescopes to trigger follow up observations. A newly proposed algorithm is optimized to find long timescale doublets and triplets, where two or three astrophysical neutrino event candidates are observed from the same direction within 30 days. This signature selects neutrino sources close to our galaxy, and makes it easier to do the follow up observation by optical telescopes. To characterize the alert before live operation, an archival analysis was performed using 12 years of data collected from 2011 to 2022 and confirmed the validity of the algorithm. The archival analysis will be presented along with the sensitivities to future alerts.

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Session Classification: GWMM: Gravitational Waves & MultiMessenger

Track Classification: Gravitational Waves & MultiMessenger