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Neutrino-triggered target-of-opportunity programs in IceCube

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IceCube is capable of monitoring the whole sky continuously, while optical and high energy photon telescopes have limited fields of view and are not likely to observe a potential neutrino-flaring source at the time such neutrinos are recorded. The use of neutrino-triggered alerts thus aims at increasing the availability of simultaneous multi-messenger data, which can increase the discovery potential as well as constrain the phenomenological interpretation of the high energy emission of selected source classes. The requirements of a fast and stable online analysis of potential neutrino signals and its operation will be discussed. The status and the recent improvements of a neutrino-triggered program in IceCube are described. The currently running systems generate real-time alerts based on multiplets of neutrinos occurring close in time and space, and these alerts are received for follow-up observations by various instruments, ranging from optical (PTF) and X-ray (Swift) to gamma-ray (H.E.S.S., MAGIC and VERITAS). The possibility in the near future to additionally send alerts based on single high energy neutrino events of likely astrophysical origin will also be discussed.

Collaboration

IceCube

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