

Multi-messenger astronomy with high-energy neutrinos

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The recent discovery of high-energy astrophysical neutrinos has opened a new window to the Universe.

In September 2017, the detection of a high-energy neutrino in coincidence with a flaring gamma-ray blazar revealed the first compelling high-energy neutrino source candidate. At the same time, gamma-ray blazars are disfavored as the dominant neutrino source class.

Other plausible source candidates are tidal disruption events, low-luminosity gamma-ray bursts and supernovae. Combining neutrino data with electromagnetic measurements in a multi-messenger approach will increase the sensitivity to identify neutrino sources and help to solve long-standing problems in astrophysics such as the origin of cosmic rays.

I will review the recent progress in neutrino multi-messenger astronomy and high-light the potential of the novel optical survey instrument Zwicky Transient Facility (ZTF) to probe various source classes as neutrino emitters.