

Third Gravi-Gamma Workshop: The multimessenger view of the black hole life cycle



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Beginning a journey across the Universe: the discovery of extragalactic neutrino factories

Friday, 7 October 2022 12:00 (30 minutes)

Neutrinos are the most elusive particles in the Universe, capable of travelling nearly unimpeded across it. Despite the vast amount of data collected, a long standing and unsolved issue is still the association of high-energy neutrinos with the astrophysical sources that originate them. Amongst the candidate sources of neutrinos there are blazars, a class of extragalactic sources powered by supermassive black holes that feed highly relativistic jets, pointed towards the Earth. Previous studies appear controversial, with several efforts claiming a tentative link between high-energy neutrino events and individual blazars, and others putting into question such relation. In this work we show that blazars are unambiguously associated with high-energy astrophysical neutrinos at unprecedented level of confidence, i.e. chance probability of 2×10^{-6} . This statistical analysis provides the observational evidence that blazars are astrophysical neutrino factories and hence, extragalactic cosmic-ray accelerators.

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