

Multi-epoch monitoring of TXS 0506+056 with MAGIC and MWL partners

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The measurement of an astrophysical flux of high-energy neutrinos by IceCube is an important step towards finding the long-sought sources of cosmic rays. Nevertheless, the long exposure neutrino sky map shows no significant indication of point sources so far. The real-time follow-up of neutrino events turned out to be the most successful approach in neutrino point-source searches. It brought, among others, the most compelling evidence for a neutrino point source: the flaring gamma-ray blazar TXS 0506+056 in coincidence with a single high-energy neutrino from IceCube (IceCube-170922A). The fast MWL follow-up of this alert was key for establishing this coincidence and constrain the subsequent theoretical modeling for this event. In the long term, accurate and contemporaneous MWL spectral measurements are essential ingredients in investigating the physical processes leading to particle acceleration and emission of radiation. A deeper understanding of those processes allows us to put constraints on the potential neutrino emission. Here we present the light curves and simultaneous spectral energy distributions from several years of MAGIC and MWL monitoring of TXS 0506+056 (November 2017 till February 2021). We also present the theoretical interpretation of these observations. We discuss their implications on cosmic-ray accelerations in AGN and the physics of relativistic jets from supermassive black holes.

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