

Multi-messenger study of TXS 0506+056 blazar

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Motivation

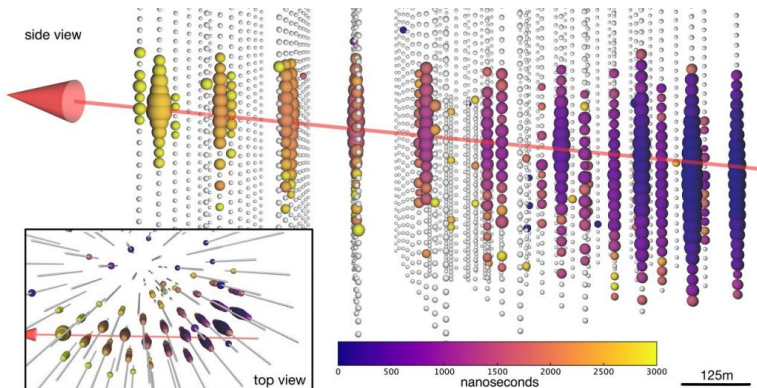


Figure: IceCube-170922A neutrino alert
Credit: IceCube- IceCube Collaboration et al. 2018

Observations

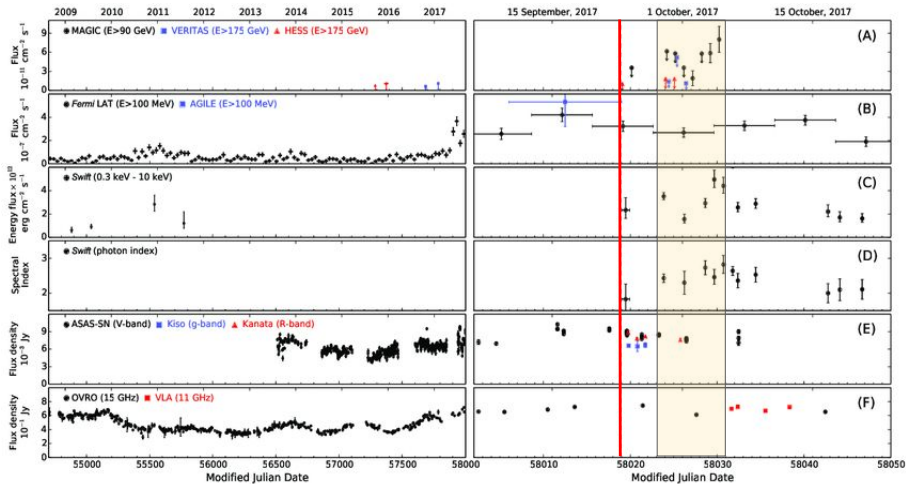


Figure: Multiwavelength Observation in different epoch IceCube-IceCube Collaboration et al.2018

Multiwavelength observations

Table: Multiwavelength observations of TXS 0506+056 blazar during different epochs

Detector	Epoch (MJD)	ATel
VLA	58031, 58032, 58035, 58038	VLA-10861
<i>Kanata</i>	58019, 58020, 58021	kanata-10844
Swift UVOT	58019	Swift-XRT-21930
Nustar	58025	Nustar-10845
Swift XRT	58023, 58026	Swift-XRT-21930
Fermi-LAT	58011 to 58023	Fermi-10791
VERITAS	58018, 58019, 58024, 58026	Veritas-10833
H.E.S.S.	58019, 58020, 58021	HESS-10787
MAGIC	58024 to 58029	MAGIC-10817

Light Curve

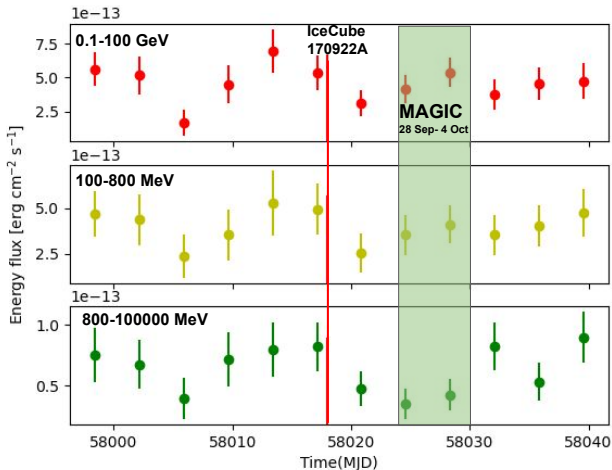


Figure: The light curve of TXS 0506+056 blazar in three different energy ranges using Fermi. (Sunanda et al. submitted)

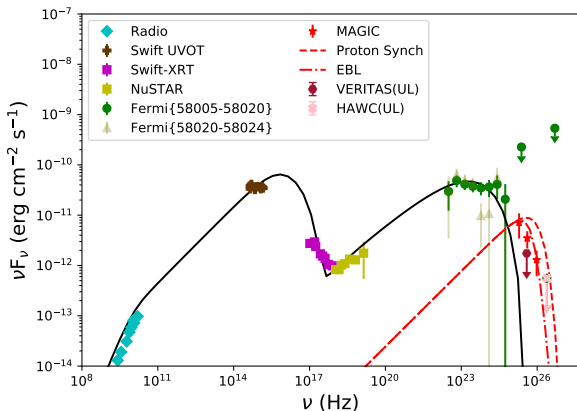


Figure: The photon flare for Optical, X-ray and HE gamma-rays by Fermi-LAT has been modeled with the electron synchrotron and SSC using **GAMERA-package** and MAGIC observations are modeled with proton synchrotron emission radiation. A details of time of follow up is given in Table.1 (Sunanda et al. submitted) .

Time Period

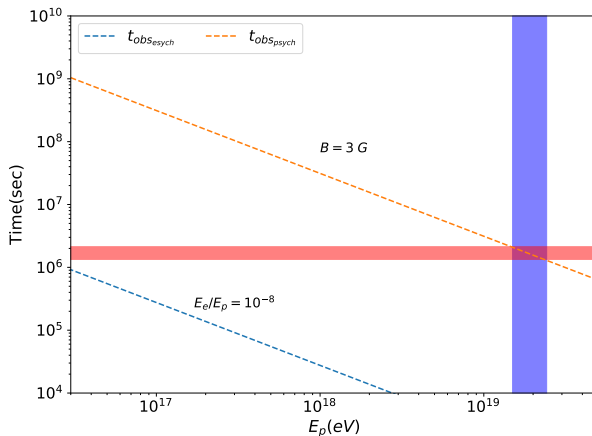


Figure: To explain time delay, the electron and proton synchrotron cooling times in the observer frame (Sunanda et al. submitted).

- **Time Delay**

- Time delay between HE and VHE photons emissions from TXS 0506+056.

- **Proton Synchrotron**

- We proposed this delay can be explained due to two production channels electron synchrotron and proton synchrotron.

- **Modelling**

- Parameters: magnetic field 3G, $L'_p \simeq 10^{47}$ erg/sec

- MAGIC observation: non-optical weather condition

