Blazars as high-energy neutrino emitters

The source of the astrophysical neutrino source is still unknown. Blazars are considered as possible astrophysical $\nu$ emitters.

Flat Spectrum Radio Quasars:
- The rich radiative environment boost the $p\gamma$ reaction.
- They are too rare in the Universe to produce the entire neutrino flux observed by IceCube. (No multiplets detection)

BL Lacs:
- They are abundant in the nearby Universe.
- Their photon density is not enough to trigger $p\gamma$ reaction. (low accretion rate)
- Structured jet could potentially boost the BL Lac emission up to the level required by the $\nu$ detected by IceCube!
- TXS0506+056 is a BL Lac object!!

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BL Lac as neutrino emitters

TXS0506+056 is a BL Lac of 2FHL catalogue (Fermi detection above 50GeV).

Assuming BL Lacs objects of 2FHL as the only emitters of IceCube neutrino flux:
- We assume a simple linear relation between $\gamma$-ray and neutrino fluxes, $F_\gamma$ and $F_\nu$, to obtain a neutrino flux for each source and the expected count rate observed by IceCube and Km3NeT. [Righi et al. 2017]
- We started an observational campaign to a better characterization of 7 others BL Lacs of 2FHL in spatial correlation with a neutrino event. [Righi et al. submitted]

A NEW PROBLEM:

Mkn421 is the brightest BL Lac object in the sky. Why we do not have clear detection of neutrino events from this source? [Righi et al. in prep.]

For more details have a look to my poster

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