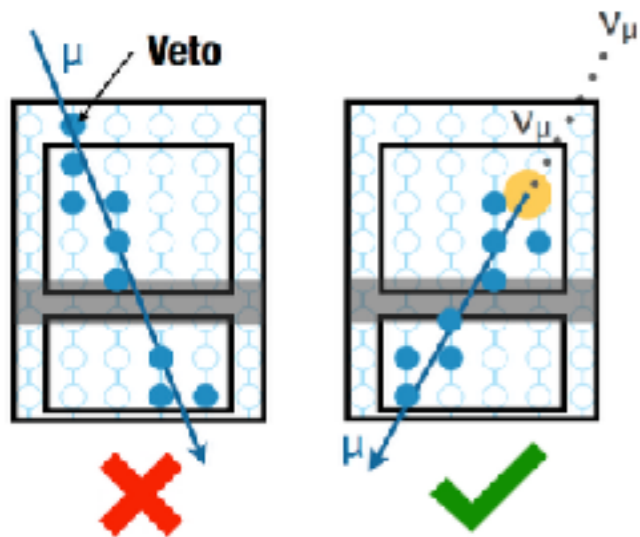
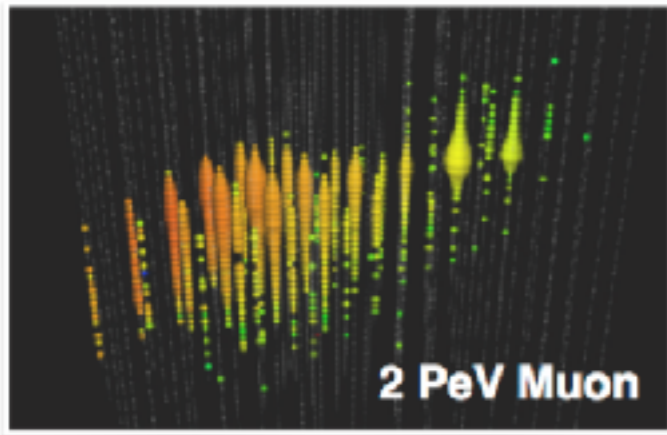


# NEUTRINO ALERTS BY ICECUBE

## Contained events



Tracks:  $\Delta\Psi \lesssim 1^\circ$



*Extremely  
High-Energy Events*

Online filtering

IRIDIUM

Analysis

Alert  
triggering

Median latency  $\sim 30$  sec.

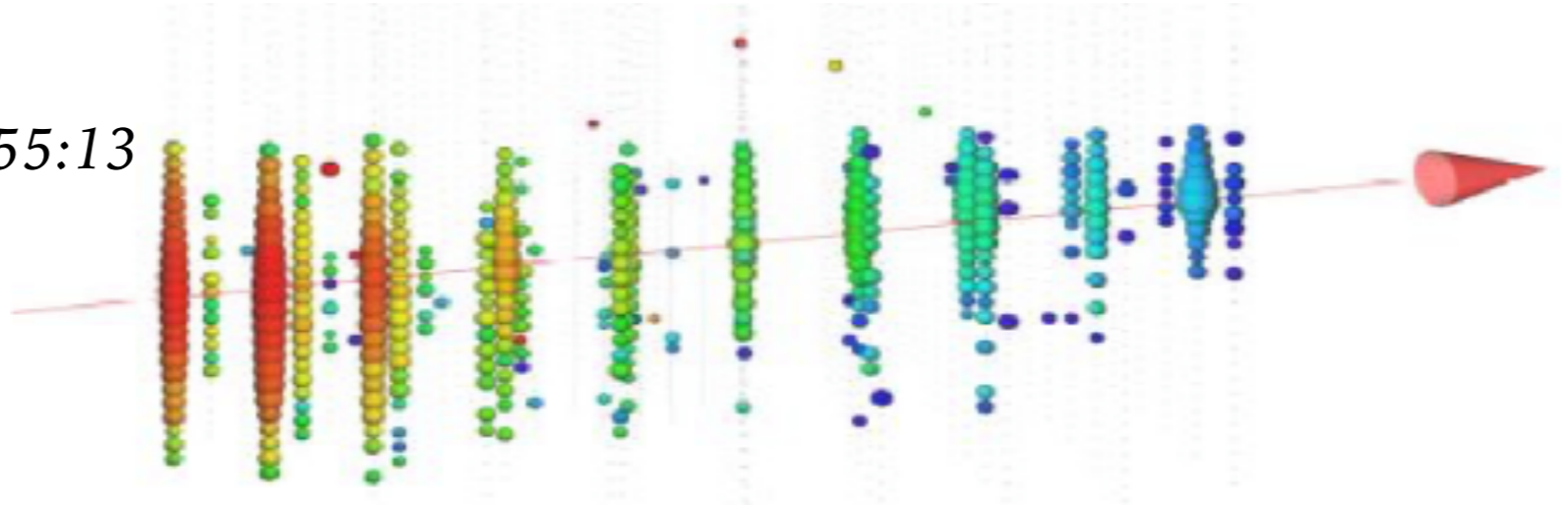
Rate of alerts :

- Contained events: 4 / yr (1 signal + 3 background for  $E^{-2.6}$ )
- High-Energy: 6 / yr (4 signal + 2 background for  $E^{-2}$ )

# IC170922A : THE 5<sup>TH</sup> EHE ALERT

.....  
*Lots of questions remain... (when multi-wavelength astronomy comes into play)*

- 22nd Sept. 2017 at 20:54:30 UTC
- First notice: 22nd Sept. 2017 at 20:55:13 (43s later)
- Deposited energy  $\sim 120$  TeV
- Angular error:  $\sim 15'$



**Fermi-LAT detection of increased gamma-ray activity of TXS 0506+056, located inside the IceCube-170922A error region.**

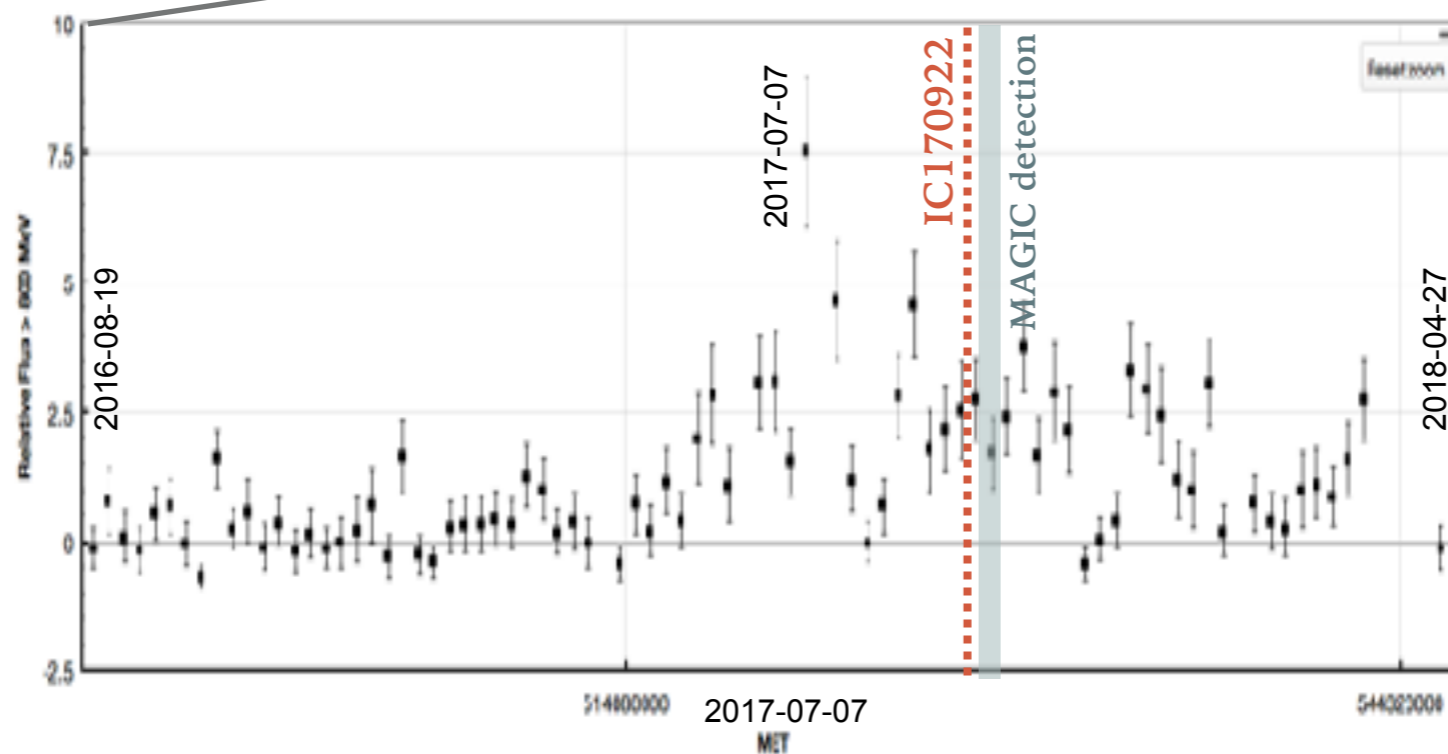
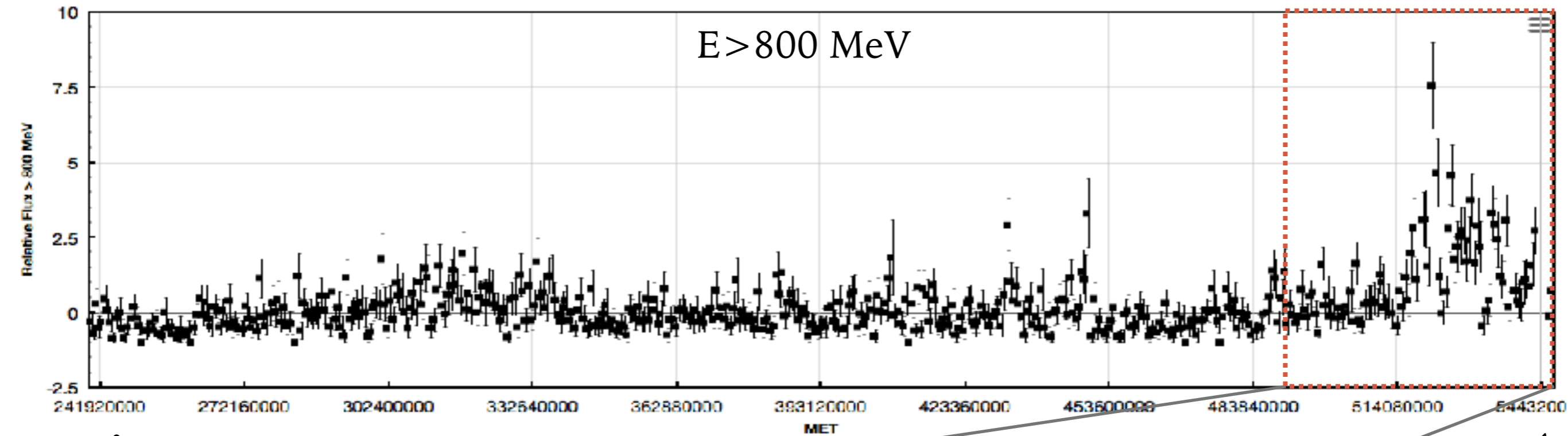
ATel #10791; *Yasuyuki T. Tanaka (Hiroshima University), Sara Buson (NASA/GSFC), Daniel Kocevski (NASA/MSFC) on behalf of the Fermi-LAT collaboration*  
on 28 Sep 2017; 10:10 UT  
Credential Certification: David J. Thompson (David.J.Thompson@nasa.gov)

- *Significance of the coincidence:*  
*rate of neutrinos x blazar density x duty cycle  $\rightarrow \sim 4\sigma$*

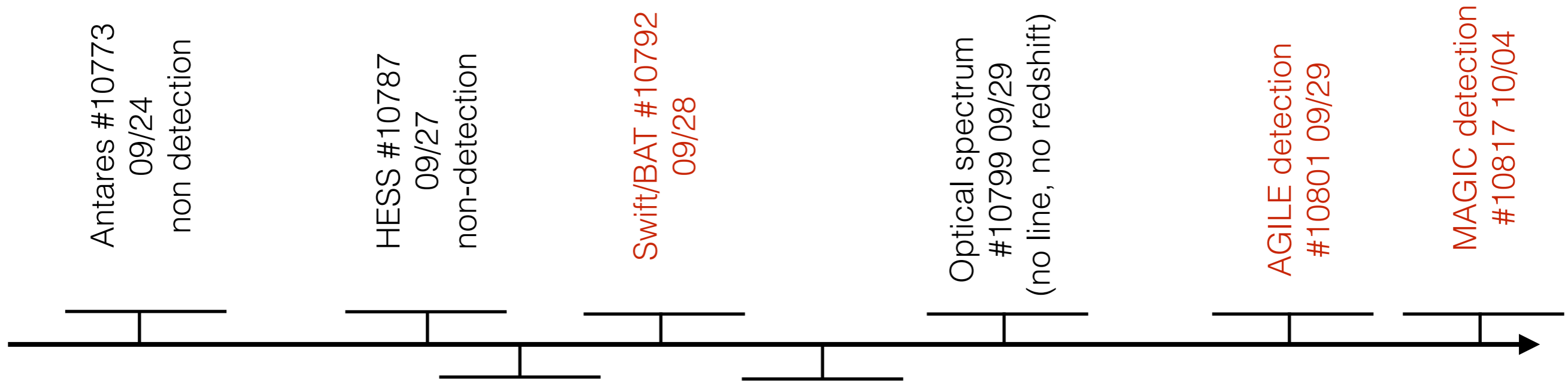
**First-time detection of VHE gamma rays by MAGIC from a direction consistent with the recent EHE neutrino event IceCube-170922A**

ATel #10817; *Razmik Mirzoyan for the MAGIC Collaboration*  
on 4 Oct 2017; 17:17 UT  
Credential Certification: Razmik Mirzoyan (Razmik.Mirzoyan@mpp.mpg.de)

# IC170922A : THE 5<sup>TH</sup> EHE ALERT

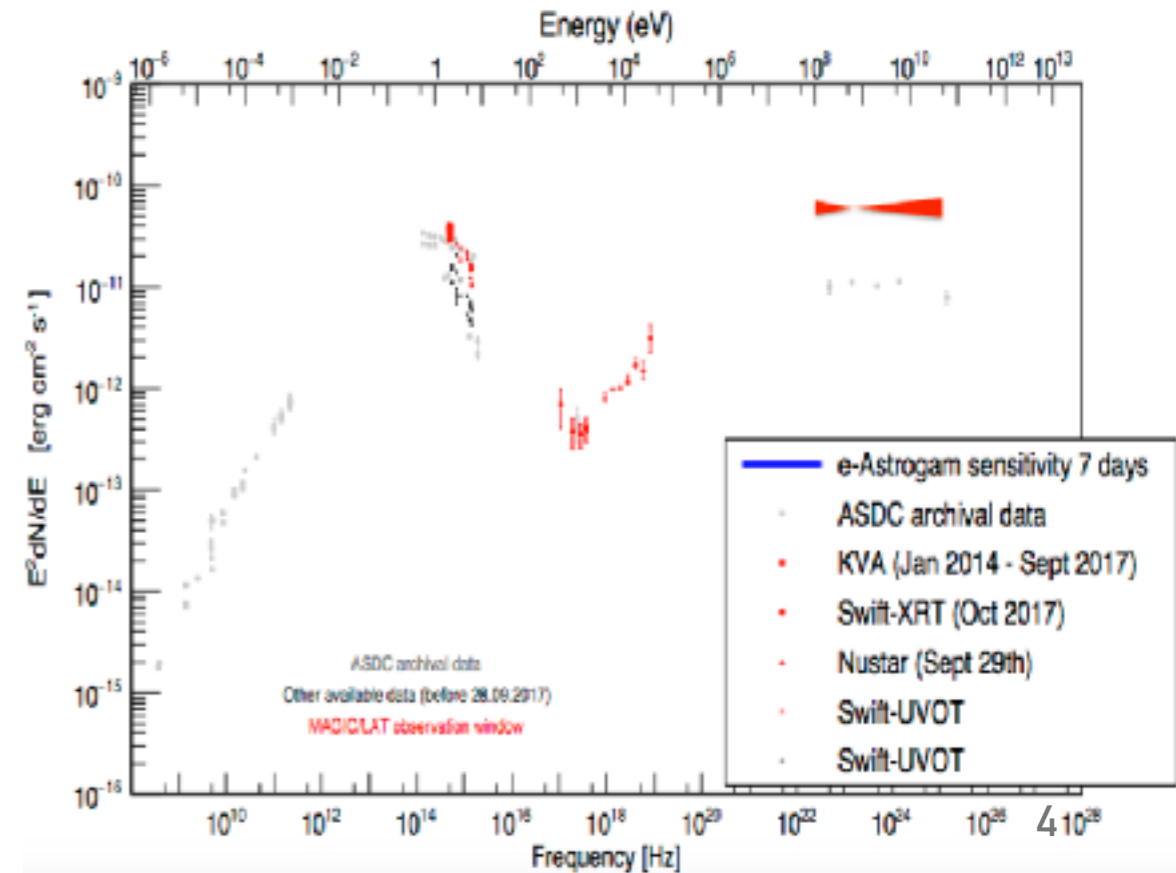


# IC170922A : THE 5<sup>TH</sup> EHE ALERT



Fermi/LAT #10791  
09/28

ASAS-SN 09/28  
optical lightcurve  
#10794



... and observations and reports by many more telescopes:  
AGILE, ASAS-SN, Kapteyn, Kanata, Liverpool, Subaru,  
VERITAS, VLA, X-Shooter, GTC, ...

# IC170922A / TXS 0506+056

Lots of questions remain... (when multi-wavelength astrophysics comes into play)

- TXS 0506+056 is the likely counterpart of EHE-170922A
- TXS 0506+056 = IBL at  $z=0.336$  (Paiano et al., ApJL, 2018)
- Detected at VHE by MAGIC (one of the few VHE-detected IBLs)  
→ important information for modelers
- What are the specificities of this blazar ?
- Can neutrinos be produced efficiently by BL Lac ?
- Can it be a source of UHECRs ?

