

# **New blazar discoveries with VERITAS: The impact of Fermi**

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2009 Fermi Symposium

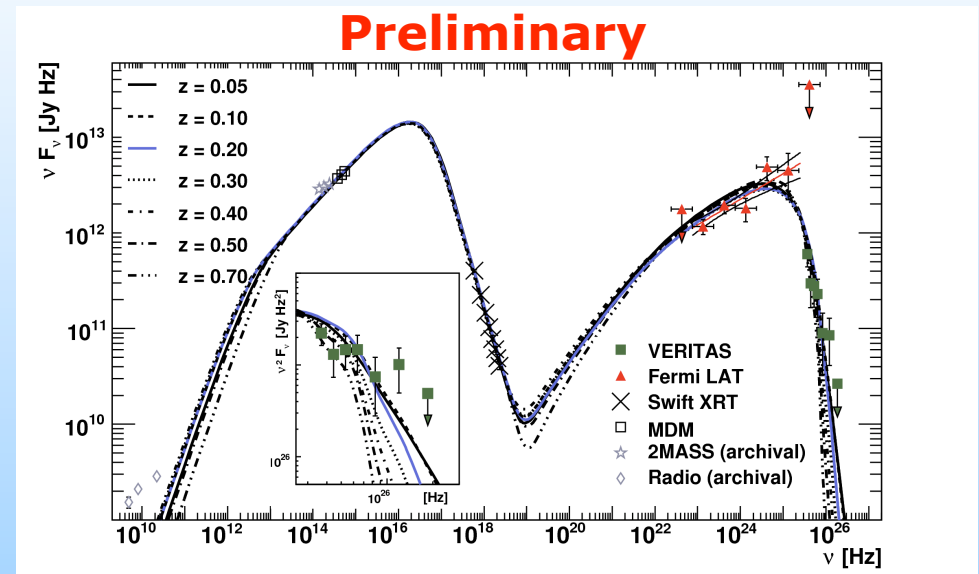
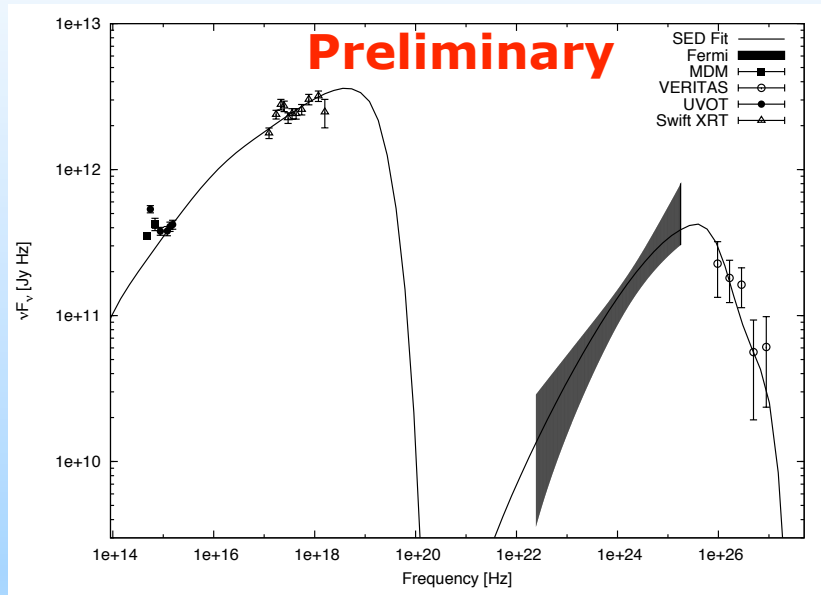
Washington D.C

# VERITAS Status: T1 Relocation



- Significant improvement in sensitivity
- 1% Crab in 50 hours → 1% Crab in 30 hours
- See Perkins & Maier poster

# VERITAS new blazars, before LAT data release

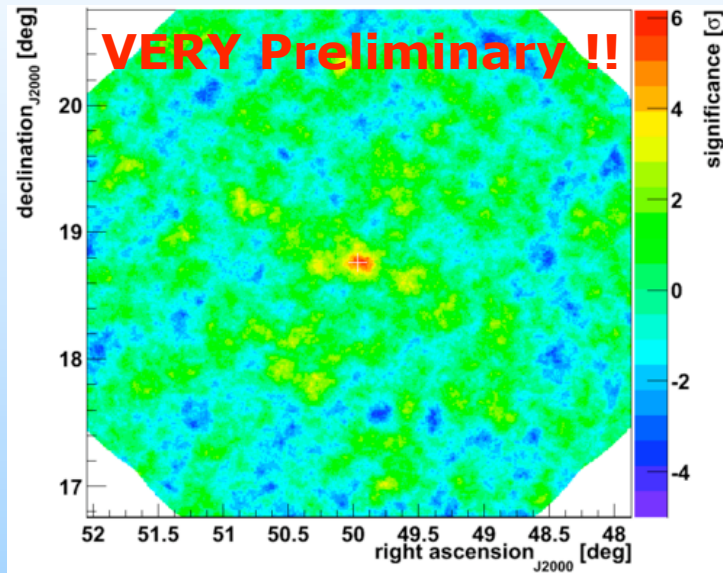


- RGB J0710+591
- HBL
- $z=0.125$
- VERITAS detected - alerted the LAT team
- LAT sees  $8\sigma$  source
- Hard TeV spectrum ,  $\Gamma=2.6 \pm 0.3$
- See Fortin & Perkins poster

- PKS 1424+240
- IBL/HBL
- $z$  unknown
- Selected as good TeV candidate from the BSL
- First LAT-motivated VHE detection
- $\sim 5\%$  Crab,  $\Gamma=3.8 \pm 0.5$
- see Furniss poster



# VERITAS new blazars, after LAT data release



- RBS 0413
- HBL
- $z=0.19$
- VERITAS and LAT detected  
- joint ATEL

## Discovery of High-Energy Gamma-Ray Emission from the BL Lac Object RBS 0413

ATel #2272; *Rene A. Ong (UCLA), on behalf of the VERITAS Collaboration; Pascal Fortin (LLR), on behalf of the Fermi Large Area Telescope Collaboration*  
on 29 Oct 2009; 18:42 UT  
Password Certification: Rene Ong (rene@astro.ucla.edu)

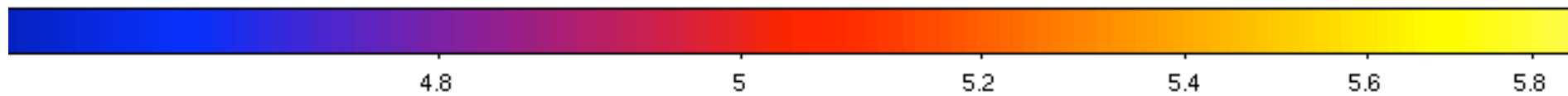
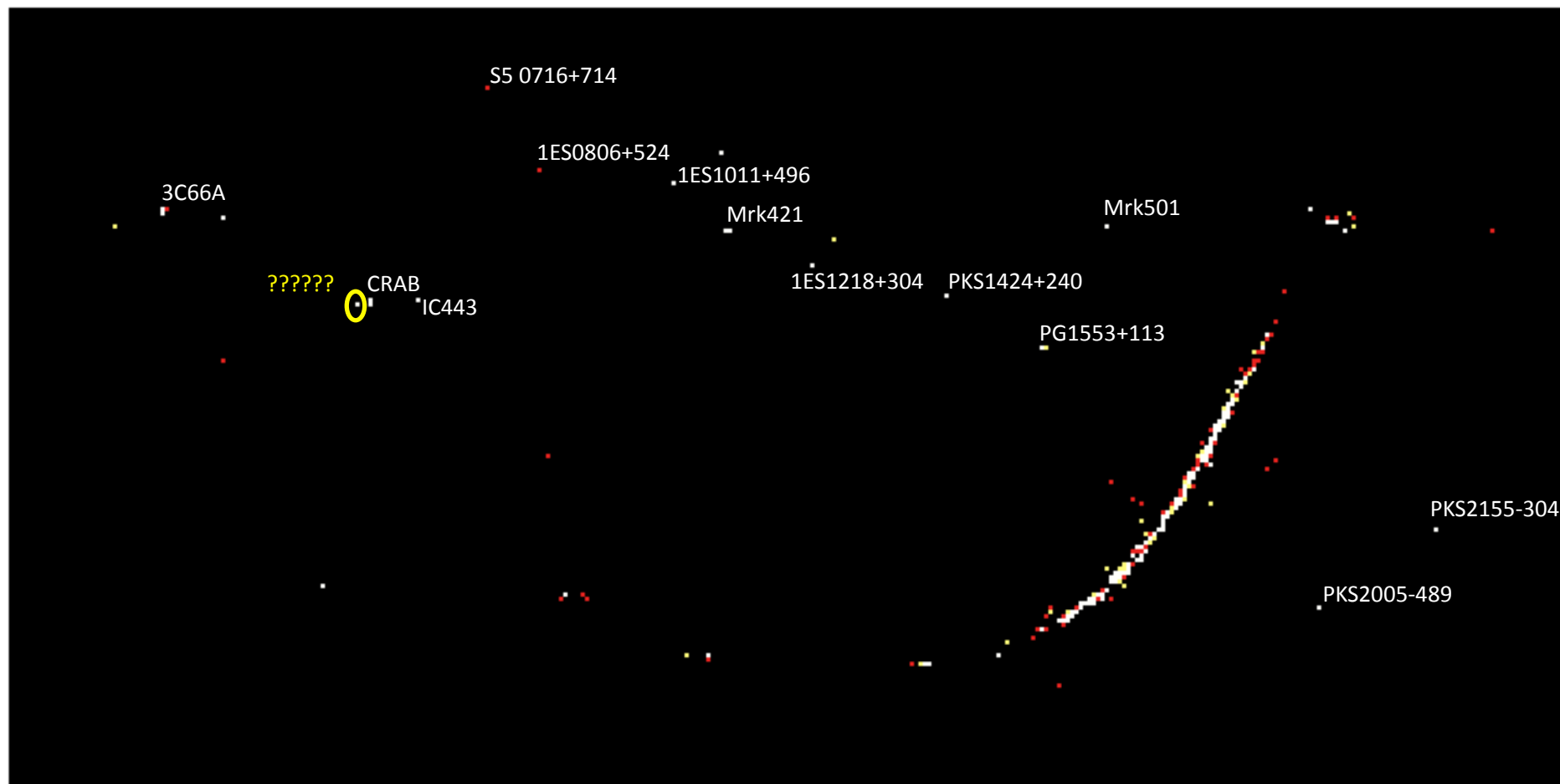
**Subjects: Gamma Ray, >GeV, Request for Observations, AGN**

The VERITAS and Fermi-LAT Collaborations report the discovery of gamma-ray emission from the high-frequency-peaked BL Lac object RBS 0413 (RA: 03h19m51.8s, Dec: +18d45m34s). The redshift of this blazar is 0.19 (Stoeckle, J. et al. 1991, ApJS, 76, 813). Very-high-energy (VHE; >100 GeV) gamma rays were detected in ~16 hours of good-quality observations obtained between 23 September 2008 and 26 October 2009 with the VERITAS atmospheric-Cherenkov telescope array. Analysis of the VERITAS data yields a detection of ~270 gamma rays from a source position that is consistent with RBS 0413, corresponding to a statistical significance of ~6 standard deviations. The observed VHE flux is ~2% of the Crab flux above 200 GeV.

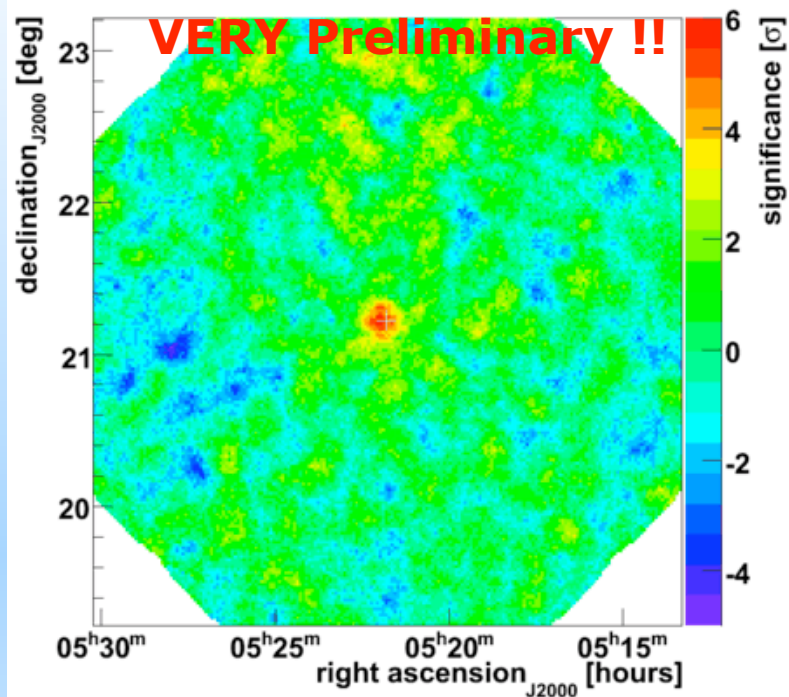
The Large Area Telescope (LAT), one of the two instruments on the Fermi Gamma-ray Space Telescope, detected high-energy (HE; > 100 MeV) gamma rays from a source positionally consistent with RBS 0413 with a statistical significance of ~10 standard deviations. Preliminary analysis of the data taken during the first 12 months of the mission (4 August 2008 to 4 August 2009) indicates an average flux above 100 MeV of  $(2.4 \pm 1.0) \times 10^{-9}$  photons  $\text{cm}^{-2} \text{s}^{-1}$ , and a very hard spectral index of  $(1.42 \pm 0.15)$ . Errors are statistical only.

Multi-wavelength observations of this blazar are encouraged. The LAT contact person for this blazar is Pascal Fortin (fortin@poly.in2p3.fr). Questions regarding the VERITAS observations should be directed to Rene Ong (rene@astro.ucla.edu).

# Fermi 1 degree binned 1 year raw photon map >30GeV



# VERITAS new blazars, after LAT data release



## VERITAS discovery of a new VHE Gamma-ray Source, VER J0521+211

ATel #2260; *Rene A. Ong (for the VERITAS Collaboration)*

on 25 Oct 2009; 23:42 UT

Distributed as an Instant Email Notice (Request for Observations)

Password Certification: Rene Ong (rene@astro.ucla.edu)

Subjects: Gamma Ray, >GeV, Request for Observations, AGN

The VERITAS Collaboration reports the discovery of a new very high energy (VHE;  $E > 100$  GeV) gamma-ray source, VER J0521+211, at R.A. = 80.48, Dec. = +21.19 (J2000), with a positional uncertainty of about 0.05 degrees. This new VHE source was detected with a significance of 5.5 standard deviations in 230 minutes of observations between 22 October 2009 and 24 October 2009 (UT) with the VERITAS atmospheric-Cherenkov telescope array. The observations were motivated by the identification of a high energy (>30 GeV) source at this position in the public Fermi-LAT data. This position is also consistent, within errors, with the position of the radio-loud active galaxy RGB J0521.8+2112, detected in the ROSAT all-sky X-ray survey and included in the RASS-Green Bank catalog, for which the redshift is unknown. The VHE flux measured by VERITAS is ~5% of the steady Crab Nebula flux above 200 GeV. Observations at all wavelengths are encouraged in order to clarify the nature of this object. In particular, optical spectroscopy would be extremely valuable to determine the unknown redshift.

- VER J0521+21
- Identified as a hotspot in >30GeV map
- z unknown
- Most likely a radio-loud AGN
  - RGB J0521.8+2112
- NB - 3 degrees from the Crab!

The LAT is changing the way we do TeV Astronomy!!!