

## T 79: Gammaastronomie III

Zeit: Donnerstag 16:30–18:35

Raum: Philo-HS7

**Gruppenbericht**

T 79.1 Do 16:30 Philo-HS7

**Recent Highlights of the MAGIC Telescopes** — ●MARTIN WILL for the MAGIC-Collaboration — Max-Planck-Institut für Physik, München

MAGIC is a system of two 17m Imaging Air Cherenkov Telescopes, located at the Observatorio Roque de los Muchachos on the Canary Island of La Palma. MAGIC measures gamma rays in the very high energy regime between around 50 GeV and 50 TeV. In this presentation, highlights from Galactic and extragalactic observations and transient follow up programs are presented, as well as the performance and recent technical upgrades of the telescopes.

T 79.2 Do 16:50 Philo-HS7

**FACT - Probing the Periodicity of Active Galactic Nuclei** — ●THOMAS BRETZ for the FACT-Collaboration — RWTH Aachen, Germany

Periodic signals from Active Galactic Nuclei could arise from Keplerian motion in binary black hole systems, accretion flow instabilities, jet motion or other reasons. With the HEGRA telescope system, a hint for a periodic modulation of 23-days was seen for Mrk 501 at TeV energies in coincidence with a hint for modulation in X-rays. Recently, a quasi-periodic modulation of PG1553+113 of about 2 years was observed with Fermi at GeV energies supported by consistent data points from MAGIC at TeV energies. Since most models for periodic modulations of TeV emission predict time scales in the order of weeks, only unbiased and continuous long-term monitoring can lead to conclusive results. With its dedicated observation strategy for monitoring the brightest blazars, the First G-APD Cherenkov Telescope (FACT) is ideally suited for such a study. This talk presents the result of a periodicity analysis on five years of data taken on Mrk 501 and Mrk 421 analysed with a Lomb-Scargle algorithm.

T 79.3 Do 17:05 Philo-HS7

**Variability study of the Crab Pulsar above few tens of GeV with MAGIC** — ●GIOVANNI CERIBELLA for the MAGIC-Collaboration — Max-Planck-Institut für Physik, München, Deutschland

The Crab Nebula shows flaring activity in the energy range around 100 MeV, but the origin of such large flux variations is still unknown. The flares could originate in the nebula itself or around the pulsar, the central engine of the source. The pulsar is known to be stable at the hundreds of MeV energy domain, but its temporal behaviour at few tens of GeV has never been probed. Due to the very low energy-threshold provided by the new Sum-Trigger-II, MAGIC is an ideal instrument to perform a study of the stability of the pulsar, on timescales as short as days. If detected, this variability at VHE will constitute a remarkable new result, which could shed light on the mechanisms of the pulsar emission and pulsar/nebula interactions. We will present the first proof-of-concept results of the project, the plans for the next future, as well as the status of the MAGIC Sum-Trigger-II system.

The MAGIC Telescopes are two Imaging Atmospheric Cherenkov telescopes located on the Canary island of La Palma, at 2200 m a.s.l.. The Sum-Trigger-II is a new system designed to detect the lowest energy air showers, extending the sensitivity of MAGIC down to 30 GeV and even below.

T 79.4 Do 17:20 Philo-HS7

**Studying TeV Blazars with HAWC and FACT** — ●MICHAEL BLANK<sup>1</sup>, DANIELA DORNER<sup>1</sup>, JOSE ANDRES GARCIA<sup>2</sup>, MAGDALENA GONZALEZ<sup>2</sup>, and ROBERT LAUER<sup>3</sup> for the FACT-Collaboration — <sup>1</sup>Universität Würzburg, Germany — <sup>2</sup>UNAM, Mexico — <sup>3</sup>UNM, USA

Blazars are highly variable objects on time scales from minutes to years. To study typical variability time scales from few hours to one day, continuous monitoring is crucial. To cover up to 12 hours of observations, data from the TeV monitoring instruments HAWC and FACT are combined. While the imaging air Cherenkov telescope FACT features a better sensitivity, HAWC provides a more continuous time coverage, as it is independent of weather and sun using the water Cherenkov technique.

Being the two brightest blazars in TeV energies, Mrk 421 and Mrk 501 are ideal targets for a combined variability study. Taking into account three years of data, we investigate the flux and spectral variabil-

ity. The light curves of the two instruments have been compared and agree very well. Outliers found in the nightly flux correlation of the two instruments can be attributed to intra-night variability. Apparent flux changes within 12 hours can also be explained by changes of the spectral shape given the different energy ranges. Therefore, we study the spectral behaviour especially for flaring episodes. To determine time periods with constant flux, bayesian blocks are used. For a time range with constant flux, we determine the spectra for both instruments.

The presentation will show the results of the analysis of the combined data sample from HAWC and FACT.

T 79.5 Do 17:35 Philo-HS7

**The First Catalog of Fermi-LAT sources below 100 MeV** — ●GIACOMO PRINCIPE, DMITRY MALYSHEV, and STEFAN FUNK — ECAP, Erlangen Nuremberg University, Germany

Previous analyses of point sources in the gamma-ray range were done only below 30 MeV (COMPTEL) or above 100 MeV (Fermi-Large Area Telescope). Below 30 MeV, the imaging Compton telescope (COMPTEL) detected 26 steady sources in the energy range from 0.75 to 30 MeV. At high energy, the LAT detects more than three thousand sources between 100 MeV and 300 GeV (3FGL). Since the Fermi-LAT detects gamma rays down to 20 MeV, we create a list of sources detected in the energy range between 30 MeV and 100 MeV, using PG-Wave, a background independent tool that makes use of a wavelet-based method. This closes a gap of point source analysis between the COMPTEL catalog and the previous Fermi-LAT catalogs. We present the Fermi-LAT low energy catalog (1FLE) of sources detected in the 30 MeV - 100 MeV range, based on 8 years and 9 months of Fermi-LAT data.

T 79.6 Do 17:50 Philo-HS7

**Pair cascades in active galactic nuclei** — ●CHRISTOPH WENDEL and KARL MANNHEIM — Fakultät für Physik und Astronomie, Universität Würzburg, Germany

External radiation fields due to recombination radiation from photo-ionized gas clouds or thermal emission from accretion flows lead to energy losses of relativistic particles in active galactic nuclei. Near the central black hole, particle acceleration by impulsive injection from flares or magnetospheric vacuum gaps or photons from photo-pion decay can induce pair cascades driven by inverse-Compton energy losses of primary or secondary electrons and positrons. Here, we discuss the kinetic equations and their numerical solution describing the emerging radiation from such pair cascades in the context of recent high-energy observations.

T 79.7 Do 18:05 Philo-HS7

**Spectral and Temporal Behaviour of Mrk 501 in Gamma Rays** — ●DANIELA DORNER<sup>1</sup>, MICHAEL BLANK<sup>1</sup>, NACHIKETA CHAKRABORTY<sup>2</sup>, and CARLO ROMOLI<sup>3</sup> for the FACT-Collaboration — <sup>1</sup>Universität Würzburg, Germany — <sup>2</sup>MPIK Heidelberg, Germany — <sup>3</sup>DIAS, Dublin, Ireland

The blazar Mrk 501 is a well-known BL-Lac type object emitting some of the highest energy photons emanating from an extragalactic source. It is highly variable down to timescales of a few minutes at TeV energies. This makes it an excellent laboratory for studying particle acceleration and radiative emission processes in jets through the spectral and temporal properties of the observed emission.

Since 2012, the First G-APD Cherenkov Telescope (FACT) is continuously monitoring Mrk 501 providing a total of more than 2000 hours of physics data. In June 2014, FACT recorded enhanced activity with an exceptional outburst at TeV energies on June 23rd. Several alerts were sent to the community. Based on this, also H.E.S.S. has observed the high state of Mrk 501 comparable to its historical maximum of 1997. At GeV energies, the Fermi satellite is monitoring the sky.

Here, we present the complex temporal and spectral behaviour of Mrk 501 in gamma-ray energies. We compute the gamma-ray power spectral density as well as the energy spectrum for the highest TeV flux state observed by H.E.S.S. and FACT in June 2014. We compare the behaviour of the strong activity in June with the long-term behaviour in the whole 2014 season. Furthermore, we study the spectral index in correlation with the different fluxes states.

T 79.8 Do 18:20 Philo-HS7

**Search for TeV Radio Galaxies Using High-Resolution Radio Images** — •KEVIN SCHMIDT, LENA LINHOFF, and SIMONE MENDER  
— TU Dortmund, Lehrstuhl für Experimentelle Physik Vb, Otto-Hahn-Straße 4a, 44227 Dortmund

Active galactic nuclei (AGN) belong to the most powerful sources in the universe. They dominate the gamma-ray sky and are regularly observed by imaging cherenkov telescopes. In the past years a new class of very-high-energy emitters was found, the TeV radio galaxies. These

sources show big differences to existing models, therefore they are interesting objects for studies.

With the help of morphological radio analysis promising sources can be extracted from a sample of candidates. This can be achieved by obtaining important characteristics from high-resolution images made by radio interferometers. Finding more TeV radio galaxies is necessary to learn about the properties of this type of AGN and its emission processes. In this talk first results of the ongoing analysis of high-resolution radio images of some TeV radio galaxy candidates will be presented.