T 39: Gamma-Astronomie I

Zeit: Dienstag 16:00–18:25 Raum: S14

Gruppenbericht T 39.1 Di 16:00 S14

FACT - Highlights from an Unbiased Monitoring Program — •Thomas Bretz for the FACT Collaboration-Collaboration — RWTH Aachen, III. Physikalisches Institut A, Germany

The First G-APD Cherenkov Telescope (FACT) has been monitoring bright sources at TeV energies since more than seven years, collecting a total of more than 12000 hours of physics data. Thanks to the usage of silicon-based photosensors, the duty cycle of the instrument is maximized and the gaps in the light curves are minimized. Combined with the observing strategy of unbiased monitoring, an unprecedented data sample has been obtained.

This allows not only for systematic studies of the variability of the sources, but also triggers a lot of multi-wavelength observations. Recent results from these studies will be presented.

Gruppenbericht T 39.2 Di 16:20 S14

MAGIC: Highlights and recent developments from the Galactic and extragalactic physics programme — •Dominik Elsässer for the MAGIC-Collaboration — TU Dortmund

The MAGIC telescope system consists of two 17m diameter imaging air Cherenkov telescopes operated at the Canary Island of La Palma. Even after more than 15 years since the inauguration of the first telescope, and several highly successful upgrades of the system, the physics portfolio of MAGIC is still growing in both scope and depth. In this talk, recent highlights from the observational programme will be presented, which include amongst others detailed studies of the VHE spectra of supernova remnants, key contributions to multi wavelength campaigns on AGN, and the detection of VHE emission from a blazar coincident with a high energy neutrino event. The talk will conclude with an outlook on propagating this programme into the era of the Cherenkov Telescope Array.

T 39.3 Di 16:40 S14

FACT - Spectral variability of TeV-blazars — •Marc Klinger, Marvin Beck, Fabian Theissen, and Thomas Bretz for the FACT Collaboration-Collaboration — RWTH Aachen, Germany

Due to it's ability to measure even under extreme conditions such as full moon nights in combination with it's completely automatic data taking system, the First G-APD Air Cherenkov Telescope (FACT) is well suited for the long term observation of gamma-ray sources. Since the first light in 2011, more than seven years of data from several sources has been acquired, in particular also from two of the brightest TeV-blazars Mrk421 and Mrk501. This allows an unprecedented insight into the variability of these objects. Extracting spectra and combining them with other multi-wavelength data allows to compile time-resolved spectral energy distributions challenging most models.

In this context, a recent model will be studied. It is based on particle-in-cell (PIC) simulations of reconnection driven plasmoids forming in a blazar's jet. In contradiction to most used steady state models, it directly provides predictions on the temporal behavior which can be compared with experimental data.

T 39.4 Di 16:55 S14

FACT - Studying Blazar Variability — •Bernd Schleicher for the FACT Collaboration-Collaboration — Universität Würzburg

The First G-APD Cherenkov Telescope (FACT) is monitoring a small sample of high energy gamma-ray sources. Active Galactic Nuclei emit radiation over the whole electromagnetic spectrum up to TeV energies. Blazars are one subtype with their jets pointing towards the observer. One of their typical features is extreme variability on timescales from minutes to years. To quantify the variability of a light curve, often the fractional variability is used. To study blazar variability depending on energy and time, FACT data are combined with public multi-wavelength data from other instruments in various energy ranges. Different detection methods and sensitivities of the instruments result in different cadence and time binning of the data sets. The effect of these differences on the fractional variability needs to be studied and taken into account for the physics interpretation. On the one hand, systematic effects of cadence and time binning are investigated. On the other hand, the fractional variability is studied depending on energy and time.

T 39.5 Di 17:10 S14

Multiwavelength Analysis of NGC 1275/3C 84 using MAGIC, FermiLAT and VLBA Data — •Lena Linhoff and Kevin Schmidt — TU Dortmund

The radio galaxy 3C 84 is a well studied source of radio emission and was detected as misaligned blazar NGC 1275 also in the very high energy regime by gamma ray detectors like MAGIC and FermiLAT. Radio images show multiple and variable emission regions within the core of the galaxy moving away from the innermost core component. In the gamma ray regime the source is known to be variable in flux and experienced some flaring activity in 2017. The Radio flux shows a slight but constant increase in radio emission until mid 2016. Since the origin of the gamma ray emission is still unclear, multiwavelength studies are performed to explain the behavoir of the source. This talk presents a multiwavelength analysis using data taken by MAGIC and the VLBA from 2005 until 2018.

T 39.6 Di 17:25 S14

GRB observations with H.E.S.S. II — •Edna L. Ruiz-Velasco for the H.E.S.S-Collaboration — Max Planck Institute for Nuclear Physics, Heidelberg, Germany

Imaging Atmospheric Cherenkov Telescopes (IACTs) present larger effective area than GeV-range gamma-ray satellites like Fermi-LAT at energies above 50 GeV. The later, has proven the existence of non-thermal high energetic gamma-ray emission of many gamma-ray burst (GRBs) up to energy of tenths of GeVs. The High Energy Stereoscopic System (H.E.S.S) is an IACT array composed by four 12 m diameter and one 28 m diameter telescopes, making it the first hybrid array of Cherenkov Telescopes. Its characteristics allows and energy threshold of ˜100 GeV and unprecedented sensitivity making it perfectly suitable for studying the very-high energy emission of GRBs. In this contribution we will describe the H.E.S.S. GRBs observation program, the trigger methods and results on several GRBs observed in the previous years. This compilation represents the largest list of GRB triggers followed up with IACTs and provides numerous inputs for GRB modelling at the very high energies.

T 39.7 Di 17:40 S14

Overview of recent results of the MAGIC astroparticle and fundamental physics programme — •Moritz Hütten for the MAGIC-Collaboration — Max-Planck-Institut für Physik, Föhringer Ring 6, 80805 München

In this report, we present the latest results of searches for signs for new physics in extraterrestrial gamma rays and cosmic-ray studies with the MAGIC telescopes. MAGIC is a stereoscopic system of two imaging atmospheric Cherenkov telescopes located on the Canary island of La Palma. Recent efforts of the group comprise hunting for indirect gamma-ray signals from WIMP dark matter in dwarf galaxies and the Perseus cluster of galaxies; probing the Lorentz invariance of gamma-ray signals from the Crab pulsar; and limits on the flux of Earth-skimming PeV τ neutrinos. We will conclude with an outlook on ongoing analyses and current efforts of the group.

T 39.8 Di 17:55 S14

MAGIC Obsevations of Pulsars with the Sum-Trigger-II — •Ceribella Giovanni for the MAGIC-Collaboration — Max-Planck-Institut für Physisk, München, Deutschland

MAGIC is a stereoscopic system of two Imaging Atmospheric Cherenkov Telescopes at 2200 m above see level, on the Spanish Canary Island of La Palma. During the first 15 years of activity, MAGIC gave birth to the observation of VHE pulsars from the ground with the discovery of the emission above 25 GeV of the Crab Pulsar, and continued contributing to the study of this object through multiple observation campaigns.

In the last years a low-energy trigger system, the Sum-Trigger-II, has been put into operation. This made MAGIC a very proficient instrument for the observation of soft gamma-ray emitters such as pulsars. This recently led to the detection of pulsed gamma rays from the Geminga pulsar, which became the third known object of its kind to be observed with IACTs.

In this talk we will review MAGIC results in the field of VHE pulsars with Crab and Geminga data. In addition, we will present technical

details on the Sum-Trigger-II.

T 39.9 Di 18:10 S14

Very Large Zenith Angle Observations with the MAGIC Telescopes — •Juliane van Scherpenberg[1], Razmik Mirzoyan[1], Ievgen Vovk[1], Michele Peresano[1], Darko Zaric[2], Jürgen Besenrieder[1], and Masahiro Teshima[1] — [1]Max-Planck Institut für Physik, München, Deutschland — [2]University of Split, Croatia

The MAGIC Telescopes are a system of two Imaging Air Cherenkov Telescopes (IACTs) located at the Roque de los Muchachos Observatory on the Canary Island of La Palma. MAGIC can observe very-high energy (VHE) gamma rays from around 50 GeV to 50 TeV. In the last years, MAGIC performed observations at very large zenith angles (VLZA) to extend the spectra up to the highest gamma-ray energy regime. However, measurements of this kind bear many challenges. The calibration of the atmosphere needs to be well understood as well as more technical restrictions concerning for example the image size of the shower and the azimuthal dependence of the stereo reconstruction quality. I will present the methods we use to account for these difficulties and show the first results of VLZA observations of the Crab Nebula.