T 92: Gammaastronomie 4

Zeit: Donnerstag 16:45–19:00 Raum: ZHG 008

T 92.1 Do 16:45 ZHG 008

VERITAS observations of very high energy emission from B2 1215+30 — •Heike Prokoph — DESY, Platanenallee 6, D-15738 Zeuthen

VERITAS is an array of four imaging atmospheric Cherenkov telescopes located in southern Arizona sensitive to gamma rays in the very high energy range (VHE; E>100GeV). The investigation of gamma-ray emission from blazars is one of the VERITAS collaboration's key science projects.

This contribution investigates the VHE emission from the low-frequency-peaked BL Lacertae object B2 1215+30. It was first reported as a VHE source by the MAGIC collaboration in early 2011 during a flare that lasted four nights. Based on VERITAS observations performed from December 2008 to June 2011 I will report on the detection and spectral analysis of B2 1215+30 as well as its long term variability.

T 92.2 Do 17:00 ZHG 008

IC 310 - A head-tail radio galaxy? — •Dorit Eisenacher for the MAGIC-Collaboration — Institut für Theoretische Physik und Astrophysik, Lehrstuhl für Astronomie, 97074 Würburg, Deutschland

IC 310 is a peculiar VHE gamma-ray source detected by Fermi-LAT in high energy and by MAGIC in the very high energy range with atypically hard spectrum. It was formerly considered to be an archetypical head-tail radio galaxy. Recently, radio interferometric observations with VLBA have shown that IC 310 is a radio galaxy with a blazar-type central engine. The 'tail' at kiloparsec scales shares the direction and possibly the motion of the inner parsec-scale radio jet (the 'head'), corresponding to a blazar-type jet. The source is a key object because it is either one out of four known radio galaxies detected at TeV-energies or the closest known blazar and the presently best candidate for a hadronic accelerator among all extragalactic jets. The talk reports about the new results from MAGIC as well as from the VLBA observation and the interpretation of these.

T 92.3 Do 17:15 ZHG 008

VERITAS follow-up observations of GRBs detected by Fermi and Swift — •Christian Skole — DESY, Platanenallee 6, 15738 Zeuthen

The VERITAS experiment is a ground based Cherenkov telescope array located in southern Arizona, USA. Its purpose is the measurement of very high energetic gamma-rays with a maximum sensitivity ranging from 100 GeV to 10 TeV.

As many theoretical models predict, gamma-ray bursts (GRBs) and their afterglows should be able to emit photons in this energy range. To gain better understanding of the processes that lead to those short intensive outbursts an important point of the VERITAS observing plan is the rapid follow-ups of GRBs detected by satellite experiments like Fermi and Swift.

In this study we will present the upper limits of several GRBs measured with VERITAS during the past observing seasons.

T 92.4 Do 17:30 ZHG 008

Search for Very-High-Energy Gamma-Ray Emission from GRB100621A with H.E.S.S. — •Dirk Lennarz, Paula Chadwick, Wilfried Domainko, Gavin Rowell, Thomas Tam, Yves Gallant, Dieter Horns, Gerd Pühlhofer, Christian Stegmann, and Stefan Wagner for the H.E.S.S.-Collaboration — Max-Planck-Institut für Kernphysik, P.O. Box 103980, D 69029 Heidelberg, Germany

The origin of gamma-ray bursts (GRBs) and their internal acceleration mechanisms are among the most enigmatic questions in contemporary astrophysics. GRBs are predicted to emit very-high-energy (VHE, $>$ 100 GeV) γ-rays due to ultra-relativistic shock acceleration and the detection of such radiation would give important insights into the acceleration and radiation processes at work. The H.E.S.S. imaging Cherenkov telescope array, detecting VHE radiation, has observed the long GRB 100621A, the brightest X-ray source ever detected by the *Swift* satellite in the keV range. Due to its relatively small redshift of $\sim$ 0.5, the favourable position in the southern sky and the relatively short follow-up time this GRB is within reach of the H.E.S.S. instrument. The analysis of the H.E.S.S. data is presented in this contribution.

T 92.5 Do 17:45 ZHG 008

Discovery of VHE gamma-ray emission from the direction of the globular cluster Terzan 5 — •Wilfried Domainko[1], Andre-Claude Clapson[2], Francois Brun[1], Peter Eger[3], Marek Jamrozy[4], and Michal Dyrda[5] for the H.E.S.S.-Collaboration — [1]Max-Planck-Institut fuer Kernphysik, P.O. Box 103980, D 69029 Heidelberg, Germany — [2]EIPOD fellow, Cell Biology and Biophysics & Developmental Biology Units, EMBL Heidelberg, Meyerhofstrasse 1, 69117 Heidelberg — [3]Universitaet Erlangen-Nuernberg, Physikalisches Institut, Erwin-Rommel-Str. 1, D 91058 Erlangen, Germany — [4]Obserwatorium Astronomiczne, Uniwersytet Jagiellonski, ul. Orla 171, 30-244 Krakow, Poland — [5]Instytut Fizyki Jadrowej PAN, ul. Radzikowskiego 152, 31-342 Krakow, Poland

Globular clusters are old stellar systems which exhibit very-high stellar densities in their cores. The globular cluster Terzan 5 is characterized by a high stellar encounter rate and hosts the largest detected population of millisecond pulsars. It also features bright GeV gamma-ray emission and extended X-ray radiation. However, no globular clusters have been detected in very-high-energy gamma rays (VHE, E $>$ 100 GeV) so far. In order to investigate this possibility Terzan 5 has been observed with the H.E.S.S. telescope array in this energy band. The discovery of a source of VHE gamma rays from the direction of this globular cluster will be reported. The results of the VHE analysis and a multi-wavelength view of Terzan 5 will be presented in this contribution. No counterpart or model can fully explain the observed morphology of the detected VHE gamma-ray source.

T 92.6 Do 18:00 ZHG 008

Investigation of the energy spectrum of blazars based on the measured data from Markarian 501 — •Michaela Voth and Julia K. Becker — Ruhr-Universität Bochum, Fakultät für Physik & Astronomie, Theoretische Physik IV, Germany

The BL Lacertae object Markarian 501 is a very high energy blazar. The measured spectral energy distribution (SED) shows the characteristic double-peaked profile. The peak at lower energies attributes to synchrotron radiation from relativistic electrons and positrons within the blazar jets. There are two different theories favored as candidates for the interpretation of the high energy peak: the leptonic and the hadronic model. In the leptonic model the high energy emission can be explained with the Inverse Compton effect. In the hadronic model the second peak is interpreted as a result of neutral pion decay into gammas, originating from the interact Ion of protons with the photon field. In the context of those different models the energy spectrum will be discussed. To analyse the characteristics of the SED it is necessary to solve the kinetic equation for the electron population inside the radiation source. In order to examine the maximum energy of the energy spectrum, the gamma-gamma opacity is investigated. It depends on the energy and follows from the electron number density and the cross section. Finally, the analysis is expected to extract the energy value at which the high energy source becomes optically thick for gamma-gamma interactions. This result can be compared to the measurement data.

T 92.7 Do 18:15 ZHG 008

MAGIC stereoscopic observations of Markarian 421 during high source activity in January 2010 — •Burkhard Steinke[1], Andrea Boller[2], and David Paneque[1] for the MAGIC-Collaboration — [1]MPI für Physik, München — [2]ETH Zürich, Schweiz

The Imaging Atmospheric Cherenkov Telescopes MAGIC are performing ground-based gamma-ray astronomy in the very high energy regime. The system consists of two 17m-diameter telescopes, located at the Canary Island of La Palma. Both telescopes work together in stereoscopic mode since end of 2009. MAGIC is covering an energy range from $<$100 GeV to $>$10 TeV and has a typical energy resolution of 15-25%.

Among the targets of MAGIC observations are blazars, a subclass of Active Galactic Nuclei (AGN). For this class a high luminosity relativistic jet, originating in the center of the host galaxy, is pointing towards the Earth. The closest known and one of the best studied representatives of the blazar subclass is Markarian (Mrk) 421. In this talk, the first MAGIC stereoscopic observations of Mrk 421 during high source activity are presented. Implications on emission processes po-

tentially responsible for the observed flux variations are also discussed.

T 92.8 Do 18:30 ZHG 008

Observations of W51 with the MAGIC Telescopes — •Julian Krause[1], Ignasi Reichardt[2], and Emiliano Carmona[3] for the MAGIC-Collaboration — [1]Max-Planck-Institut für Physik, D-80805 München, Germany — [2]IFAE, Edifici Cn., Campus UAB, E-08193 Bellaterra, Spain — [3]Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Madrid, Spain

W51 located at the Sagitarius arm of the milky way at a distance of 5.5 kpc is a well-known star-forming region hosting both a supernova remnant molecular cloud association and a possible pulsar wind nebula. High energy gamma-ray emission was reported from Fermi/LAT as well as very high energy gamma-ray emission was detected by the H.E.S.S. collaboration. Previous measurements could not reveal the spatial origin of the extended emission. The spectrum obtained by Fermi/LAT however suggests a hadronic origin of the emission. The VHE observations presented here, obtained with MAGIC stereo system, allow us to pinpoint the VHE gamma-ray emission to the interaction region between the remnant and the molecular cloud. The MAGIC data also allow us to measure, for the first time, the VHE emission spectrum of W51 from the highest Fermi/LAT energies up to several TeV.

T 92.9 Do 18:45 ZHG 008

Probing The Dark Matter Halo With the Future CTA Observatory — •Emrah Birsin[1,3], Constanze Jahn[2], Ullrich Schwanke[1], and Gerrit Spengler[1] — [1]Institut für Physik, Humboldt-Universität zu Berlin, Newtonstrasse 15, D-12489 Berlin, Germany — [2]Physikalisches Institut der Friedrich-Alexander Universität Erlangen-Nürnberg Erwin-Rommel-Str. 1, Büro 312 D-91058 Erlangen — [3]for the CTA consortium.

Weakly Interacting Massive Particles (WIMPs) are well motivated candidates for Dark Matter (DM) which was produced thermally in the Big Bang. For WIMPs with masses of more than 100 GeV photons from DM annihilation could be observable with Cherenkov telescopes. The currently most constraining limits were derived from observations with the H.E.S.S. array of Cherenkov telescopes when targeting the Milky Way halo in the vicinity of the Galactic Center region. These observations exclude values of the velocity averaged annihilation cross section bigger than few $10^{-25} cm^{-3} s^{-1}$, a value one order of magnitude larger than the annihilation cross-sections expected in extensions to the Standard Model of particle physics. The improved sensitivity of the next-generation gamma-ray observatory Cherenkov Telescope Array (CTA) will allow to further probe the WIMP parameter space. The contribution presents estimates of the sensitivity of a DM search in the galactic halo with CTA.