T 83: Gamma-Astronomie 2

Zeit: Dienstag 16:45–19:05 Raum: M218

Gruppenbericht T 83.1 Di 16:45 M218

MAGIC goes stereo: The status of MAGIC II commissioning — •Thomas Schweizer for the MAGIC-Collaboration — MPI für Physik, Föhringer Ring6, 80805 München

MAGIC is one of the very successful Cherenkov telescope installations in the world with the world largest operating single dish telescope. MAGIC has produced many interesting results in gamma-ray astronomy. Now MAGIC is expanded into a stereo system by the construction of a second telescope. The second telescope will improve the sensitivity by a factor of about 2, especially in the energy range below 100-150 GeV, it will also improve the angular resolution and the energy resolution significantly. The status of the commissioning and first results are reported here as well as a time schedule for the operation in stereo mode.

T 83.2 Di 17:05 M218

Performances of MAGIC-II stereo-analysis. — •Pierre Colin for the MAGIC-Collaboration — Max-Planck-Institut fuer Physik, Werner-Heisenberg Institut, Foehringer Ring 6, 80805 Muenchen, Germany

The TeV-gamma-ray observatory MAGIC-II is an arrays of two 17m-diameter imaging atmospheric Cherenkov telescopes operating in La Palma (Canary islands). The first telescope has been working for several years and it discovered many new sources and important results in the TeV regime. The second telescope is in final commissioning phase and scientific observations with two telescopes (stereoscopic mode) will start in early 2009, improving strongly the sensitivity. In this talk, we present the MAGIC analysis of stereoscopic data and discuss the performances estimated from Monte Carlo simulations. We show improvements of the energy reconstruction, angular resolution and cosmic-ray discrimination resulting from the use of two telescopes instead of one.

T 83.3 Di 17:20 M218

Development of the new analog sum trigger for the MAGIC Telescope: Concept and realization. — •Maxim Shayduk[1], Adam Nepomuk Otte[2], Michael Rissi[3], Thomas Schweizer[1], Eckart Lorenz[1], and Razmik Mirzoyan[1] for the MAGIC-Collaboration — [1]Max Plank Institute, Muenchen — [2]University of California, Santa Cruz — [3]ETH, Zurich

A new analog trigger concept which allows to reduce significantly the energy threshold of Cherenkov telescopes has been designed and implemented for the MAGIC telescope. The analog signals of a patch in the camera consisting of 18 pixels are summed up in an analog way. In order to prevent accidental triggers from PMT-afterpulses signals are clipped at a certain amplitude. Short pulses, induced by cosmic showers, allows us to keep the coincidence time window very short and strongly suppress accidental triggers from night sky background (NSB). Also, unlike the usual digital trigger designs, all low amplitude signals in the given patch in the camera are summed up and fully contribute to the trigger decision. This improves signal to noise ratio. This trigger concept provides a low cost trigger installation and very effective and stable trigger for Cherenkov telescopes.

The new trigger system was installed and commissioned in October 2007. The Crab pulsar was observed from October 2007 until February 2008 with a threshold of 25 GeV - the lowest trigger threshold ever achieved for Cherenkov telescopes. The detailed description of the design of the novel trigger system and the analisys results will be presented here.

T 83.4 Di 17:35 M218

Calibration and Performance tests of the MAGIC-II Camera — •Daniela Borla Tridon for the MAGIC-Collaboration — Max Planck Institut, Munich

The MAGIC 17m diameter Cherenkov telescopes system has been upgraded with a second telescope within the year 2007-2008 to allow stereo observations. This will improve the sensitivity and energy threshold of the current installation. The new MAGIC-II telescope has been equipped with a camera composed of 1039 pixles with 0.1-degree diameter. Seven pixels in a hexagonal configuration are grouped to form one cluster of the camera. This modular design allows easier maintenance and replacement of photosensors. In the first phase Hamamatsu photomultipliers (PMTs) are used, with a quantum efficiency (QE) as high as $332 * 10^4$ to observe also under moderate moon conditions. In the second phase it is planned to replace the PMTs in the inner part of the camera with higher QE hybrid photo detectors (HPDs). Here we present test measurements and results perfromed on the PMT clusters.

T 83.5 Di 17:50 M218

Gamma-Hadron separation with H.E.S.S. using a multivariate analysis method — •Stefan Ohm, Christopher van Eldik, and Kathrin Egberts — Max-Planck-Institut fuer Kernphysik, Heidelberg

In recent years, Imaging Atmospheric Cherenkov Telescopes (IACTs) have discovered a rich diversity of very high energy (VHE, > 100 GeV) γ-ray emitters in the sky. These instruments image Cherenkov light emitted by γ-ray induced particle cascades in the atmosphere. Background from the much more numerous cosmic-ray cascades is efficiently reduced by considering the shape of the shower images, and the capability to reduce this background is one of the key aspects that determine the sensitivity of a IACT. Here we present the application of a tree classification method to data from the High Energy Stereoscopic System (H.E.S.S.). We show the stability of the method and its capabilities to yield an improved background reduction compared to the H.E.S.S. Standard Analysis.

T 83.6 Di 18:05 M218

Gamma-Hadronen-Separation für H.E.S.S. Phase II — •Martin Hupfer für die H.E.S.S.-Kollaboration — ECAP, Universität Erlangen-Nürnberg

Das H.E.S.S.-Experiment ist ein System von vier abbildenden Cherenkov-Teleskopen zum Nachweis von Gammastrahlung im Energiebereich oberhalb von 100 GeV. Das H.E.S.S.-System wird zur Zeit um ein fünftes größeres Teleskop erweitert, das mit einer Spiegelfläche von 600 m^2 zu einer deutlich niedrigeren Energieschwelle und größeren Sensitivität des H.E.S.S.-Systems führen wird. Das erweiterte H.E.S.S.-System (H.E.S.S. Phase II) wird Photonen mit Energien deutlich unter 100 GeV messen, die nur von dem großen Teleskop detektiert werden. Die Trennung von Photon-induzierten Ereignissen von dem großen Untergrund an Hadron-induzierten Ereignissen bei diesen Energien erfordert eine Erweiterung der bisher bei H.E.S.S. eingesetzten Methoden zur Gamma-Hadronen-Separation. In dem Vortrag werden Studien zur Gamma-Hadronen-Separation für H.E.S.S. Phase II präsentiert.

T 83.7 Di 18:20 M218

Muon Background in the MAGIC-I telescope and the MAGIC-II stereoscopic system — •Emiliano Carmona and Razmik Mirzoyan for the MAGIC-Collaboration — Max Planck Institute für Physik (Werner-Heisenberg Institut), München, Deutschland

The MAGIC-I telescope is currently the largest imaging air Cherenkov telescope in operation in the world. The construction of a second telescope is already finished and the two telescope system (MAGIC-II) will start the stereoscopic operation early in 2009. In this work we use Monte Carlo simulations to investigate the muon background in the MAGIC-I telescope and in the MAGIC-II stereo system. We also investigate the possibility to increase the MAGIC-II background rejection capabilities by tagging muon events. In addition, the possibility to use the MAGIC (I and II) fast signal sampling to improve the background rejection capabilities of the MAGIC system are also investigated.

T 83.8 Di 18:35 M218

Studies of the influence of moonlight on observations with MAGIC — •Daniel Britzger[1,2], Emiliano Carmona[1], Pratik Majumdar[3], Julian Sitarek[1,4], and Robert Wagner[1,5] for the MAGIC-Collaboration — [1]Max-Planck-Institut für Physik, D-80805 München, Germany — [2]Ludwig-Maximilians-Universität München, D-80539 München, Germany — [3]Deutsches Elektronen-Synchrotron (DESY), D-15738 Zeuthen, Germany — [4]University of Łodz, PL-90236 Łodz, Poland — [5]Excellence Cluster "Universe", D-85748 Garching, Germany

The Imaging Atmospheric Cherenkov Technique is currently the most powerful ground-based observation method for very high energy cosmic gamma rays. With its special designed camera and readout system, the MAGIC Telescope with its 17m dish, is capable of observing also during nights with comparatively high night-sky background light, as e.g. during moonlight. This enables an approx. 30% extended observation time of up to 1500h per year and further allows operation during twilight, which increases the chances to catch fast transients, e.g. blazar flares. However, the increased night-sky background influences the data acquisition and may deserve special treatment in the data analysis chain. Here we present studies of the influence of the moonlight intensity on the sensitivity of MAGIC.

T 83.9 Di 18:50 M218

MAGIC observations of the distant quasar 3c279 in 2006 and 2007 — •Karsten Berger[1], Pratik Majumdar[2], Elina Lindfors[3], Elisa Prandini[4], Manel Erando[5], and Masahiro Teshima[6] for the MAGIC-Collaboration — [1]University Lodz, Lodz, Poland — [2]Deutsches Elektronen-Synchrotron (DESY) Zeuthen, Germany — [3]Tuorla Observatory, Piikiö, Finland — [4]Dipartimento di Fisica, Università di Padova and INFN sez. di Padova, Italy — [5]Institut de Física d'Altes Energies, Barcelona, Spain — [6]Max-Planck-Institut für Physik, Munich, Germany

The flat-spectrum radio-quasar 3c279 (z=0.536) is the most distant object detected at Very High Energy (VHE) gamma-rays. It is thus an important beacon for the study of the interaction of the VHE gamma-rays with the Extra-galactic Background Light (EBL). Previous observations by EGRET showed a highly variable flux that can differ up to a factor of 100. In this talk first results from a new observation campaign during an optical flare in January 2007 will be presented and previous results from the 2006 observation campaign will be summarized.