T 65: Gammaastronomie III

Zeit: Dienstag 16:45–19:05 Raum: VMP11 HS

Gruppenbericht T 65.1 Di 16:45 VMP11 HS

FACT - More than Four Years of Reliable Operation with SiPMs in an IACT Camera — •Jens Buss and Fabian Temme for the FACT-Collaboration — Experimentelle Physik 5b, TU Dortmund, Deutschland

The First G-APD Cherenkov Telescope (FACT) is pioneering the application of solid state photo detectors for imaging atmospheric Cherenkov telescopes. Since October 2011, the FACT collaboration has successfully been showing the reliability of silicon photo multipliers (SiPMs) for earth-bound gamma-ray astronomy. Though being situated on the Canary Island of La Palma, FACT is operated remotely from Europe. Due to the robustness of SiPMs, even observations during strong moon light are possible without any need of UV-filters or a reduced voltage. Moreover, no indication for any aging of the used SiPMs has occurred so far. In consequence, this technology allowed to increase FACT's duty cycle beyond that of current generation IACTs, in order to collect a dense data sample from Active Galactic Nuclei. As a result, FACT is an ideal instrument to monitor bright and variable TeV Blazars on the northern sky. A quick-look analysis is reporting flux variations with low latency. Hence, several flare alerts were sent to partners in the Multiwavelength Community. In addition, the Monte Carlo simulations of the system were improved and show a good understanding of the SiPM's properties. The simulations fit the measured data even on proton shower level. The status and lessons learned from the experience of more than four years operation of the First G-APD Cherenkov Telescope will be presented.

T 65.2 Di 17:05 VMP11 HS

Prototyp eines SiPM Kollimator Clusters für die MAGIC-Teleskope — •Christian Jung für die MAGIC-Kollaboration — TU Dortmund, Dortmund, Deutschland

Die MAGIC-Teleskope sind zwei bildgebende Tscherenkow-Teleskope, die von der MAGIC-Kollaboration auf der kanarischen Insel La Palma betrieben werden. Beide Teleskope verwenden eine Kamera mit 1039 Photomultipliern (PMTs). An den Ecken der Kamera befinden sich freie Plätze, an denen alternative Photodetektoren getestet werden können. Momentan sind dort zwei Testcluster mit Silizium-Photomultiplier (SiPMs) eingesetzt. Sowohl bei den PMTs als auch bei den beiden Testclustern werden Winston Cones als Lichtleiter verwendet.

In einer Kollaboration zwischen der TU Dortmund, der Universität Würzburg und der Max-Planck-Gesellschaft werden Kollimatoren als Alternativen zu den Winston Cones untersucht, denn durch die Weiterentwicklung der SiPMs sind die Winston Cones nicht mehr zwingend erforderlich. Für die Kollimatoren wurden mehrere Ansätze entwickelt, simuliert und verglichen.

In diesem Vortrag werden der aktuelle Stand des Testclusters und die Ergebnisse der Simulationen vorgestellt.

T 65.3 Di 17:20 VMP11 HS

Status of the H.E.S.S. I Camera Upgrade — •Iryna Lypova[1] and for the H.E.S.S. collaboration[2] — [1]DESY, Platanenallee 6, D-15738 Zeuthen, Germany — [2]https://www.mpi-hd.mpg.de/hfm/HESS/

The High Energy Stereoscopic System (H.E.S.S.) is an array of one big and four small size Cherenkov telescopes located in Namibia. In July 2015 the camera electronics of one of the small telescopes (CT1) was renewed. The upgrade of three more (CT2-4) telescopes is planned to happen in 2016. The main goals of the upgrade is to reduce the dead time of the small telescopes, decrease the influence of night sky background light and hence improve the sensitivity of the system. For better understanding of the performance of the new camera, Monte-Carlo simulations are necessary. For their production, the CORSIKA and sim_telarray codes were used. During the talk, an overview of the CT1-4 cameras upgrade and the status of the new simulations production will be presented.

T 65.4 Di 17:35 VMP11 HS

Long-term studies of Markarian 421 from 2007 to 2009 — •Sonja Schröder[1], Ann-Kristin Overkemping[1], Marina Manganaro[2], and Diego Tescaro[3] for the MAGIC-Collaboration — [1]TU Dortmund, Dortmund, Deutschland — [2]IAC La Laguna, Teneriffa, Spanien — [3]INFN, Padova, Italien

The MAGIC experiment consists of two Imaging Air shower Cherenkov Telescopes to detect and study gamma-rays from galactic and extragalactic sources. Blazars are a special type of extragalactic sources hosting an Active Galactic Nucleus (AGN) with a jet directed towards earth. The AGN Mrk 421 is one of the strongest and brightest known blazars suitable for very high-energy (VHE) observations. This talk gives an overview over long-term variability and correlation studies of the blazar Mrk 421. For this study a VHE dataset collected by MAGIC-I covering the extensive timespan from February 2007 to June 2009 was examined together with data of different wavelengths from other telescopes. These kind of studies could allow for an increase of knowledge about the possible emission processes inside Mrk 421.

T 65.5 Di 17:50 VMP11 HS

Ein Framework zur Prozessierung von Transient-Benachrichtigungen für H.E.S.S. — •Clemens Hoischen und H.E.S.S. Kollaboration — Universität Potsdam, Potsdam, Deutschland

Die Beobachtung von kurz andauernden astrophysikalischen Ereignissen (Transients) in nahezu allen Wellenlängen ist ein wichtiger Zweig der heutigen Astrophysik. So versucht auch das H.E.S.S. Experiment beispielsweise Gammastrahlungsausbrüche (GRBs) in TeV-Gammastrahlung zu detektieren. In den kommenden Jahren startet der Betrieb von mehreren Experimenten mit großem Detektionspotential für Transients (GAIA, PTF, LSST). Dadurch wird sich die Rate an interessanten beobachtbaren Phänomenen vervielfachen. Um den Übergang zu dieser neuen Ära der Transient-Astrophysik zu ermöglichen wird für das H.E.S.S. Experiment ein Softwarekonzept entwickelt, welches modular und flexibel ist, um den Übergang von wenigen Benachrichtigungen pro Monat zu mehreren Millionen pro Nacht zu ermöglichen. Die Bausteine dieses neuen Systems und ihre Verbindungen werden vorgestellt. Ein Vergleich zum bestehenden System in H.E.S.S. wird gezogen, sowie ein Ausblick auf mögliche Erweiterungen gegeben.

T 65.6 Di 18:05 VMP11 HS

The influence of night sky background on calibration and analysis in H.E.S.S. — •Eva Leser[1] and H.E.S.S. Collaboration[2] — [1]Potsdam University — [2]https://www.mpi-hd.mpg.de/hfm/HESS/

In some regions of the galactic plane, background light by stars (night sky background) poses a severe challenge for the detection of gamma-ray sources. Thorough tests are needed to ensure a good quality of the data analysis, especially in regions with both a strong and inhomogeneous background. Investigation of the influence on calibration and data analysis is started at an early stage in data processing. Different cleaning levels were tested and the event loss rate was evaluated. It is shown that for regions with strong and inhomogeneous night sky background and a powerful source an increased cleaning level is beneficial.

T 65.7 Di 18:20 VMP11 HS

Application of the Ctools Analysis Framework to H.E.S.S. data — •Maria Haupt[1], for the H.E.S.S. collaboration[2] und Jürgen Knödlseder[3,4] — [1]DESY, Platanenallee 6, D-15738 Zeuthen, Germany — [2]https://www.mpi-hd.mpg.de/hfm/HESS/ — [3]Université de Toulouse; UPS-OMP; IRAP; Toulouse, France — [4]CNRS; IRAP; 9 Av. colonel Roche, BP 44346, F-31028 Toulouse Cedex 4, France

The data of the currently operating gamma-ray telescopes is mostly analysed with an increasingly diverse set of instrument-specific analysis tools. The instrument independent framework GammaLib is currently developed for the analysis of the high-level data products of the upcoming Cherenkov Telescope Array (CTA). It will be provided as open source software for any kind of gamma-ray data from existing telescopes. Based on GammaLib, a set of analysis executables were created (ctools). These powerful tools provide the opportunity of simultaneous multi-instrument analyses which will be in particular helpful during the HESS upgrade. The ctools software also provides support for studying extended gamma-ray sources. To test the ctools framework on HESS data, we made cross-checks on well-established sources like the Crab Nebula or the Galactic center with good agreements of the results from the HESS internal analysis framework and the ctools framework.

An overview of the instrument performance and future plans will be given.

T 65.8 Di 18:35 VMP11 HS

Simulationsbasierte Analyse der Systemperformance nach dem Kamera-Upgrade von H.E.S.S. — •Constantin Steppa[1] und for the H.E.S.S. collaboration[2] — [1]DESY, Platanenallee 6, 15738 Zeuthen — [2]https://www.mpi-hd.mpg.de/hfm/HESS/

Seit über zehn Jahren liefert das High Energy Stereoscopic System mit seinen vier 12m-Cherenkov-Teleskopen einen wichtigen Beitrag zur Gamma-Astronomie. Im Jahr 2012 wurde dem System ein 28m-Teleskop hinzugefügt, was es ermöglicht kosmische Gamma-Photonen mit einer höheren Rate und bei noch niedrigeren Energien zu messen. Momentan arbeitet die H.E.S.S. Kollaboration an einem Upgrade der Kameras der vier 12m-Teleskope mit dem Ziel, neben dem Austausch der gealterten Elektronik, die Energieschwelle der Teleskope zu reduzieren und die Rate an koinzident erfassten Bildern zusammen mit dem 28m-Teleskop zu erhöhen. Ein wichtiges Kriterium dabei ist die Reduzierung der Auslesezeit der Kameras, die bei der Datenerfassung die Totzeit der Kameras bestimmt. Anhand von Simulationen wurde der Einfluss der Totzeit auf die Performance des Gesamtsystems untersucht sowie ein durch das Upgrade mögliches neues Bildbereinigungsverfahren getestet. Das Ergebnis eines Vergleichs der Systemperformance vor und nach dem Upgrade wird vorgestellt.

T 65.9 Di 18:50 VMP11 HS

Phase measuring deflectometry: An improved setup for measuring CTA mirror facets — •Andreas Specovius, Christopher van Eldik, Andre Wörnlein, and Alexander Ziegler — Erlangen Centre for Astroparticle Physics (ECAP)

The future Cherenkov Telescope Array (CTA) will consist of up to 100 single telescopes with a total reflecting surface of $\sim$10.000 m^2 made of numerous mirror facets. Characterizing the surface properties of these facets is quite challenging concerning time and logistics. An efficient way to reliably reconstruct the surface of specular free-forms is Phase Measuring Deflectometry (PMD). PMD is routinely used to characterize the focal distance and point spread function of spherical CTA prototype mirrors. To address the possibility to measure the surface properties of aspherical mirrors, a new PMD setup has recently been built. First experience with this setup is reported.