T 73: Gammaastronomie II

Zeit: Dienstag 16:45–19:05 Raum: KGII-HS 2006

Gruppenbericht T 73.1 Di 16:45 KGII-HS 2006

The MAGIC View of our Galaxy — •Tobias Jogler for the MAGIC-Collaboration — Max-Planck-Instiut für Physik, Föhringer Ring 6, 80805 München

MAGIC is an Imaging Atmospheric Cherenkov Telescope located on the Canary Island La Palma. With this high-sensitivity instrument we study different source types located in our galaxy, such as supernova remnants, pulsar wind nebula, pulsars, binary systems, microquasars and globular clusters. Here we will present new results on various of these very high energy gamma-ray sources within our galaxy. With the MAGIC observation we are able to get a deeper insight to the energetic processes which are taking place in these sources. A very nice example is the observation of binary systems were we search for changing emission properties during the different orbital phase of these systems. Another interesting issue is the study of correlation between emission of VHE gamma rays of supernova remnants and other wavebands which might give an answer to the question of the origin of galactic cosmic rays.

T 73.2 Di 17:05 KGII-HS 2006

H.E.S.S. observations of galaxy clusters — •Wilfried Domainko[1], Wystan Benbow[1], Jim Hinton[2], Olivier Martineau-Huynh[3], Mathieu de Naurois[3], Dalibor Nedbal[4], Giovanna Pedaletti[5], and Gavin Rowell[6] for the H.E.S.S.-Collaboration — [1]Max-Planck-Institut für Kernphysik, Heidelberg, Germany — [2]University of Leeds, UK — [3]Laboratoire de Physique Nucléaire et de Hautes Energies, Universités Paris VI & VII, France — [4]Institute of Particle and Nuclear Physics, Charles University, Prague, Czech Republic — [5]Landessternwarte, Universität Heidelberg, Germany — [6]School of Chemistry & Physics, University of Adelaide, Australia

Clusters of galaxies, the largest gravitationally bound objects in the universe, are expected to contain a significant population of hadronic and leptonic cosmic rays. Potential sources for these particles are merger and accretion shocks, starburst driven galactic winds and radio galaxies. Furthermore, since galaxy clusters confine cosmic ray protons up to energies of at least 1 PeV for a time longer than the Hubble time they act as storehouses and accumulate all the hadronic particles which are accelerated within them. Consequently clusters of galaxies are potential sources of VHE (> 100 GeV) gamma rays. Motivated by these considerations, promising galaxy clusters are observed with the H.E.S.S. experiment as part of an ongoing campaign. Results from this campaign will be reported.

T 73.3 Di 17:20 KGII-HS 2006

Position of the H.E.S.S. Galactic Centre Point Source — •Christopher van Eldik, Oliver Bolz, Isabel Braun, and German Hermann for the H.E.S.S.-Collaboration — MPI für Kernphysik, Heidelberg

Observations by the H.E.S.S. system of imaging atmospheric Cherenkov telescopes provide the most precise available very high energy (VHE) gamma-ray data on the Galactic Centre region in the energy range 150 GeV - 30 TeV. The vicinity of the kinetic centre of our galaxy harbours numerous objects which could potentially accelerate particles to VHE energies and thus produce the gamma-ray flux observed. The centroid of the point-like emission measured by H.E.S.S. is in good agreement with the position of the supermassive black hole Sgr A* and the recently discovered PWN G359.95-0.04.

In this contribution an update is given on the position of the H.E.S.S. Galactic Centre source using 2005/2006 data. The systematic pointing error is significantly reduced using guiding telescopes for pointing corrections, making it possible to exclude with high significance the supernova remnant Sgr A East as the source of the TeV gamma-rays.

T 73.4 Di 17:35 KGII-HS 2006

The H.E.S.S. survey of the Galactic plane — •Stefan Hoppe and Ryan Chaves for the H.E.S.S.-Collaboration — Max-Planck-Institut fuer Kernphysik, Heidelberg, Germany

The High Energy Stereoscopic System (H.E.S.S.), located in the Khomas Highlands of Namibia, is an array of four imaging atmospheric-Cherenkov telescopes designed to detect γ-rays in the very high energy (VHE; > 100 GeV) domain. Its high sensitivity and large field of view (5 deg.) make it an ideal instrument to perform a survey within the Galactic plane for new VHE sources. Previous observations in 2004/2005 resulted in numerous detections of VHE gamma-ray emitters in the region l = 330 deg. - 30 deg. Galactic longitude. In the recent years the survey was extended, covering the regions l = 280 deg. - 330 deg. and l = 30 deg. - 60 deg., leading to the discovery of several previously unknown sources. The current status of the survey will be presented.

T 73.5 Di 17:50 KGII-HS 2006

Upgrade of the MAGIC data center — •Stefan Rügamer, Thomas Bretz, and Daniela Dorner — Institut für Theoretische Physik und Astrophysik, Universität Würzburg

The data center in Würzburg provides storage capacity and computing power to handle the data of the Major Atmospheric Gamma-ray Imaging Cherenkov (MAGIC) telescope. On top of this system, a stable and robust analysis is running automatically since two years which processes new data upon arrival or all of the $\sim$37 TB of raw data after a software improvement.

To adapt the data center to the needs of the next generation of experiments, like MAGIC-II or CTA, an upgrade is currently underway. The new system is highly scalable concerning data storage and computing power and will provide up to 1.1 PB of storage capacity when fully upgraded. High data throughput is obtained by using a hierarchical file system as well as taking advantage of the newest tape technologies (LTO4) and a fibre channel online file system. Also the computing performance will be subsequently extended. These resources will also be made available to the German astrophysics community via AstroGrid-D.

T 73.6 Di 18:05 KGII-HS 2006

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

The MAGIC 17m diameter Cherenkov telescope will be upgraded with a second telescope within the year 2007 to allow stereo observation. This will improve the sensitivity and energy threshold of the current installation. The new MAGIC-II telescope will be 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) with a high quantum efficiency (QE) with a peak of around 34%. The PMTs will be operated at a rather low gain of 20000 to operate also under moderate moon conditions. In the second phase it is planned to replace the inner PMTs with higher QE hybrid photo detectors (HPDs). Here I present results of the quality and performance tests of the PMT clusters.

T 73.7 Di 18:20 KGII-HS 2006

Test of an alternative method of the energy reconstruction for the MAGIC telescope — Valentin Curtef and •Michael Backes for the MAGIC-Collaboration — Technische Universität Dortmund

The Cherenkov telescopes of the third generation have delivered impressive results for several years and discovered lots of formerly unknown sources.

To crosscheck and optimize the energy reconstruction, we applied the unfolding algorithm with regularization (Blobel, Proc. CERN 85-09, 1985) to the problem and verified this method with an analysis of the Crab Nebula. Within further research this unfolding is applied to extragalactic sources. This includes special studies to explore the energy range below 100 GeV.

The results of both studies are presented.

T 73.8 Di 18:35 KGII-HS 2006

The optical performance of the MAGIC-II telescope — •Cornelia Lühmann, Florian Göbel, Ralf Kosyra, and Jürgen Hose for the MAGIC-Collaboration — MPI for physics, Munich, Germany

The optical performance of the mirrors for an imaging Cherenkov-telescope is of great importance since they are the first element of the detection chain. Optical parameters like the PSF (point spread function), the reflectivity and the focal length play a great role. Measure-

ments were performed to determine those parameters for the mirrors of the MAGIC-II telescope on La Palma. In this presentation the measurement principles will be described and the results for the optical parameters of the mirrors shown.

T 73.9 Di 18:50 KGII-HS 2006

Search for Pulsed VHE Gamma-Ray Emission from Millisecond Pulsars with H.E.S.S. — •Matthias Füssling and Ullrich Schwanke for the H.E.S.S.-Collaboration — Humboldt Universität Berlin

We present the results of a search for pulsed very-high-energy (VHE) gamma-ray emission from the millisecond pulsars PSR J0437-4715 and PSR J1824-2452 using data taken with the H.E.S.S. imaging atmospheric Cherenkov telescope system. No significant evidence for pulsed emission at the respective pulsar spin period is found in any data set. Differential upper limits on pulsed energy flux are determined using different limit determination methods, testing various possible pulsar light curves and energy spectra. The derived upper limits are compared to model predictions for VHE gamma-ray emission from the millisecond pulsars.