T 75: Gammaastronomie IV

Zeit: Donnerstag 16:45–19:00 Raum: KGII-HS 2006

T 75.1 Do 16:45 KGII-HS 2006

A detailed study of the gamma ray binary LS I +61 303 with MAGIC — •Tobias Jogler — Max-Planck-Instiut für Physik, Föhringer Ring 6, 80805 München

The MAGIC telescope studied for more than two years the famous binary system LS I +61 303 which is one of the four known gamma ray binaries. The system consists of a B0Ve main sequence star and a compact opbject which is either a neutron star or a black hole. Here we will disucuss the most detailed light curve derived so far in very high energy gamma rays and discuss various consequences of this observation. In addition we will present the spectral behavior of the system in different orbital phases and over large and short timescales. We will further discuss the relation between gamma ray, X-ray and radio emission.

T 75.2 Do 17:00 KGII-HS 2006

The Crab pulsar: VHE sum-trigger observations with MAGIC — •Thomas Schweizer[1], Adam Nepomuk Otte[2], Michael Rissi[3], Maxim Shayduk[2], Eckart Lorenz[1], Razmik Mirzoyan[1], and Masahiro Teshima[1] for the MAGIC-Collaboration — [1]Max Plank institute, Muenchen — [2]Humboldt Universitaet, Berlin — [3]ETH Zurich

The new observations of the Crab pulsar with the MAGIC telescope by using the analog sum trigger provide a threshold of 25 GeV-30 GeV. This allows one a detailed discussion on the physics of pulsed emission from Crab. As of today, mainly two models try to explain the emission of GeV gamma radiation from the Crab pulsar. These are the outer gap and the polar cap models. Measurements at very upper end of the spectrum may allow one to distinguish between the two models. A discussion on this topic will be presented.

T 75.3 Do 17:15 KGII-HS 2006

Observation of the Crab pulsar with MAGIC using a special very low energy threshold analog sum trigger — •Maxim Shayduk[1], Adam Nepomuk Otte[1], Michael Rissi[2], Thomas Schweizer[3], Eckart Lorenz[3], Razmik Mirzoyan[3], and Masahiro Teshima[3] — [1]Humboldt-Universitaet, Berlin — [2]ETH Zurich — [3]Max Plank Institute, Muenchen

As shown by the EGRET experiment, the lightcurves of several pulsars seen in gamma-rays extend to the energies above 10 GeV. In order to detect gamma-rays of such energies by the Imaging Atmospheric Cherenkov Telescopes (IACTs), the significant lowering of the telescope trigger threshold is neccessary. The MAGIC telescope has a trigger threshold of 50-60 GeV - the lowest threshold in ground-based gamma-ray astronomy.

The MAGIC telescope observed the Crab pulsar in the last winter using a special summation trigger setup which allows one to reduce the trigger threshold down to 25-30GeV. MC studies showed that we are sensitive down to a 15GeV cutoff energy for the pulsed emission.

The observation results for the Crab pulsar will be presented here.

T 75.4 Do 17:30 KGII-HS 2006

Establishing a connection between high-power pulsars and very-high-energy gamma-ray sources — •Andreas Förster, Svenja Carrigan, and Werner Hofmann for the H.E.S.S.-Collaboration — Max-Planck-Institut für Kernphysik, 69117 Heidelberg

Recent advances in the instrumentation to observe very-high energy (VHE) gamma rays have made the discovery of many new sources possible, most of them being discovered in the galactic plane survey of H.E.S.S., an array of imaging atmosperic cherenkov telescopes in Namibia. Of these sources, a significant number can be identified as pulsar wind nebulae. It has long been known that pulsars can drive powerful winds of highly relativistic particles which might result in VHE gamma radiation via inverse Compton upscattering of ambient photons. Details of the energy conversion mechanisms in the vicinity of pulsars are not well understood, nor is it known if all pulsars drive pulsar wind nebulae and emit high-energy radiation. It will be shown that for a sample of pulsars in the central Milky Way, pulsars with large spin-down energy flux are with a high probability associated with VHE gamma-ray sources detected by H.E.S.S. and that these pulsars emit on the order of 1% of their spin-down energy in tera electron volt gamma-ray energies.

T 75.5 Do 17:45 KGII-HS 2006

TeV Gamma-Ray Observations of the Binary Pulsar PSR B1259-63/ SS2883 near the 2007 Periastron with H.E.S.S. — •Matthias Kerschhaggl and Ullrich Schwanke for the H.E.S.S.-Collaboration — Humboldt Universität zu Berlin

The binary pulsar system PSR B1259-63/SS2883 is known as a variable TeV gamma-ray emitter since its first detection by H.E.S.S. around the last periastron in 2004. Being the first detected of the TeV gamma-ray binaries, similar to objects like LS 5039 and LS I +61 303, it represents a very interesting laboratory for the study of pulsar wind interactions with the ambient radiation field and circumstellar matter outflow from a massive companion star. The interaction mechanisms like particle acceleration due to pulsar wind termination shock dynamics and subsequent emission of TeV photons, are expected to become efficient near the periastron of the highly eccentric (e=0.87) pulsar orbit, where the separation between the two objects is ˜0.7 AU. As the orbital period of the system is roughly 3.4 years the next periastron since the first VHE observations took place on July 27, 2007. The lack of pre-periastron VHE lightcurve data of this source motivated therefore a 60h H.E.S.S. observation campaign for this passage. The results of this campaign will be discussed, compared to previous data and interpreted within the framework of current models.

T 75.6 Do 18:00 KGII-HS 2006

Untersuchung der Morphologie von Pulsarwindnebeln mit H.E.S.S. — •Fabian Schöck und Sebastian Heinz für die H.E.S.S.-Kollaboration — Erlangen Centre for Astroparticle Physics (ECAP), Universität Erlangen

Mit dem H.E.S.S. Cherenkov-Teleskopssystem wurden in den letzten Jahren eine Vielzahl von ausgedehnten hochenergetischen Gammastrahlungsquellen entdeckt, die wahrscheinlich mit Pulsarwindnebeln (PWN) assoziiert sind. PWN sind Synchrotronnebel, die durch einen relativistischen Teilchenwind von einem Pulsar geheizt werden. In diesem Vortrag wird die Anwendung von Methoden der digitalen Bildverarbeitung auf die mit H.E.S.S. aufgenommenen Bilder von PWN vorgestellt. Die verwendeten Entfaltungsalgorithmen verbessern die erreichte Winkelauflösung, lassen die morphologische Struktur besser hervortreten und ermöglichen somit eine bessere Zuordnung der beobachteten Strukturdetails im Hinblick auf die physikalischen Prozesse.

T 75.7 Do 18:15 KGII-HS 2006

Detaillierte Untersuchung hochenergetischer Gammastrahlung der Region um VelaX — •Bernhard Glück für die H.E.S.S.-Kollaboration — Erlangen Centre for Astroparticle Physics (ECAP), Universität Erlangen

Das H.E.S.S. I Experiment ist ein System aus 4 abbildenden Cherenkov-Teleskopen. Mit diesem Experiment können die Quellen hochenergetischer Gammastrahlung zeitlich, spektral und räumlich aufgelöst werden. In den Jahren 2004 und 2005 erfolgte eine Beobachtung der Region um den Vela X Pulsar. Dabei konnte sowohl der Nachweis für eine ausgedehnte Gammastrahlungsquelle erbracht werden, als auch das Energieflussspektrums der Quelle bestimmt werden. Die Quelle breitet sich über eine Länge von mehr als einen Grad in südlicher Richtung von der Position des Pulsar aus und wird mit dem Pulsarwind von Vela X assoziiert. Die Beobachtungen um Vela X werden fortgesetzt, um eine energieabhängige Untersuchung der räumlichen Strukturen zu ermöglichen. Der Vortrag gibt einen Überblick über den aktuellen Stand der Untersuchungen des Pulsarwindnebels.

T 75.8 Do 18:30 KGII-HS 2006

H.E.S.S. observations of the supernovae remnant RCW 86 — •Stefan Hoppe for the H.E.S.S.-Collaboration — Max-Planck-Institut fuer Kernphysik, Heidelberg, Germany

The shell-type supernova remnant (SNR) RCW 86 - possibly associated with the historical supernova SN 185 - was observed over the past three years with the High Energy Stereoscopic System (H.E.S.S.), an array of four atmospheric-Cherenkov telescopes located in Namibia. The multi-wavelength properties of RCW 86, e.g. weak radio emission and North-East X-ray emission almost entirely consisting of synchroton radiation, resemble those of two VHE emitting SNRs RX J1713.7-

3946 and RX J0852-4622. The H.E.S.S. observations reveal a new extended source of VHE (>100 GeV) γ-ray emission. The morphological and spectral properties of this new source will be presented.

T 75.9 Do 18:45 KGII-HS 2006

Probing Quantum Gravity with the VHE flares of PKS 2155-3004 in 2006 — •Rolf Buehler for the H.E.S.S.-Collaboration — Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg

Several Quantum Gravity models predict an energy depend dispersion relation for photons in vacuum, leading to small differences in the speed of light between photons of different energies. This minute effect was predicted to add up to measurable time lags for photons which travel over cosmological distances. Here we present a search for such time lags during the H.E.S.S. observations of the exceptional VHE flares of PKS 2155-304 in July 2006. Since no time lag is found, we derive lower limits on the energy scale on which these quantum gravity effects could become important.