T 85: Gammaastronomie 5

Zeit: Donnerstag 16:45–18:30 Raum: HSZ-E05

T 85.1 Do 16:45 HSZ-E05

Suche nach transienten Gammastrahlungsquellen — •Christian Skole — DESY, Platanenallee 6, D-15738 Zeuthen

Ein wichtige Eigenschaft von Objekten, die hochenergetische Gammastrahlen emittieren, ist deren Variabilität. Die Häufigkeit und die zeitliche Dauer der Intensitätsänderungen geben Aufschluss über die Größe der Quellen und die physikalischen Mechanismen, die in ihnen wirken. Meist ist eine kurzzeitige Intensitätsverstärkung die einzige Chance eine Quelle überhaupt erst beobachten zu können.

Bisherige Methoden zur Messung von variablen Quellen mittels abbildenden Cherenkov Teleskop Systemen beruhen allein auf dem Vergleich der Anzahl von Gammaphotonen derselben Quelle zu unterschiedlichen Beobachtungszeiten. Kurzzeitige Ratenänderungen innerhalb einer solchen Beobachtungsdauer werden dabei leicht übersehen und somit auch mögliche Quellen, die sich nur kurzzeitig in einem Zustand erhöhter Emissivität befindet.

In dieser Arbeit wurde anhand von Simulationen untersucht, wie sich die Analyse verbessern lässt indem statistische Methoden verwendet wurden, die neben der Anzahl auch den Zeitpunkt der einzelnen Gammaereignisse in Betracht ziehen. Es werden dabei zwei dieser Methoden miteinander verglichen und gezeigt inwieweit sie sich zur Entdeckung kurzzeitiger Gammasstrahlenausbrüche eignen.

T 85.2 Do 17:00 HSZ-E05

VERITAS Beobachtung und Modellierung von Blazaren — •Heike Prokoph — DESY, Platanenallee 6, D-15738 Zeuthen

VERITAS ist ein System von vier abbildenden Cherenkov-Teleskopen in Arizona (USA), welches Gammastrahlung im Energiebereich von 100 GeV bis zu 30 TeV detektiert. Eine der Quellklassen, welche bei diesen hohen Energien Strahlung emittiert, sind Blazare. Dies sind aktive Galaxien, deren Jet in Richtung des Beobachters zeigt, und welche nicht-thermische Strahlung über einen breiten Wellenlängenbereich emittieren.

Um zu verstehen, wie diese Jets aufgebaut sind und die hochenergtische Strahlung erzeugt wird, werden Blazare in möglichst vielen Wellenlängen simultan beobachtet und dann modelliert. Im einfachsten Modell wird die emittierte Strahlung innerhalb des Jets durch Synchrotron und inverse Compton-Streuung von hochenergetischen Elektronen beschrieben. In diesem Beitrag werden bisherige Beobachtungen von Blazaren mit VERITAS zusammengefasst, und die Ergebnisse der Modellierung miteinander verglichen.

T 85.3 Do 17:15 HSZ-E05

A model for the highly variable orphan flare of Markarian 501 — •Stephan Richter and Felix Spanier — ITPA, Universität Würzburg

The spectral energy densities (SEDs) of high peaked BL Lac objects (HBLs) is well known to be explained via the Synchrotron Self Compton model (SSC). Especially a number of extensive multi wavelength observation campaigns invigorated the confidence in this model, explaining the steady state SEDs. However, the observed time variability put the time dependent implementations of the SSC paradigm under pressure. Quite extreme parameters are often needed to explain light curves, that sometimes contradict the steady state fit.

In this talk we argue, that the flare of Markarian 501 on MJD 54952 in the gamma range can't be explained with a one component SSC model, starting from the steady state fit. This is mainly because of the marginal variability in the X-rays and the extreme short time variability. An alternative explanation is presented. In this model, the short variability time scale emerges from a second boost between the main blob and a second component within the jet. Using the limits of non direct detection of this second component, an estimate for its properties is computed.

The derived parameters are well within the expected range. Although the connection between observed, individual VLBI components and modeled blobs is not yet possible, the existence of multiple components is supported by such observations.

T 85.4 Do 17:30 HSZ-E05

Multi-Band Variability of the Active Nucleus of IC 310 — •Dorit Eisenacher[1], Pierre Colin[2], Saverio Lombardi[3], Julian Sitarek[4], Fabio Zandanel[5], Francisco Prada[5], Dominik Elsaesser[1], Karl Mannheim[1], David Paneque[2], Thomas Dauser[6], Felicia Krauss[6], Sven Wilbert[1], Matthias Kadler[1], Joern Wilms[6], Uwe Bach[7], and Eduardo Ros[8] for the MAGIC-Collaboration — [1]Universität Würzburg, Germany — [2]MPIfP, München, Germany — [3]INAF National Institute for Astrophysics, Rome, Italy — [4]IFAE, Barcelona, Spain — [5]IAA, Granada, Spain — [6]Dr. Remeis-Sternwarte-ECAP, Bamberg, Germany — [7]MPIfR, Bonn, Germany — [8]Dep. Astronomia y Astrofisica, Valencia, Spain

The active galaxy IC 310, located in the Perseus cluster of galaxies at z = 0.0189, has been detected from radio up to energies above 100 GeV by space and ground based instruments. Originally classified as a head-tail radio galaxy, recent high resolution VLBI radio images have reveal IC 310 to have instead a blazar-like structure on parsec scales. Here we present the VLBI data of this source and investigate its variability at X-ray and gamma-ray energies.

T 85.5 Do 17:45 HSZ-E05

Search for gamma-ray emission from the powerful AGN outburst in the Hydra A galaxy cluster — •W. Domainko[1], M. Ali[2], S. Ohm[3], L. Stawarz[4], J. Hinton[3], and P. Eger[1] for the H.E.S.S.-Collaboration — [1]MPIK Heidelberg — [2]University of Leeds — [3]University of Leicester — [4]University of Krakow

In some galaxy clusters powerful AGN have blown bubbles with cluster scale extent into the ambient medium. The main pressure support of these bubbles is not known to date, but cosmic rays are a viable scenario, implying copious gamma-ray emission. Hydra A, the closest galaxy cluster hosting a cluster scale AGN outburst, located at a redshift of 0.0538, is investigated for being a gamma-ray emitter with H.E.S.S. and the Fermi Large Area Telescope (Fermi-LAT). No signal has been found in in 20.2 hours of H.E.S.S. observations and 38 months of Fermi-LAT data. Upper limits on the gamma-ray flux are derived and are compared to models. The non-detection of Hydra A in gamma-rays has important implications on the particle populations and physical conditions inside the bubbles in this system.

T 85.6 Do 18:00 HSZ-E05

The 2009 multiwavelength campaign on Mrk 421: Variability and correlation studies — •Nina Nowak[1], David Paneque[1], Marlene Doert[2], Ulisses Barres de Almeida[1], and Diego Tescaro[3] for the MAGIC-Collaboration — [1]Max-Planck-Institut für Physik, 80805 München, Germany — [2]Technische Universität Dortmund, 44221 Dortmund, Germany — [3]Inst. de Astrofísica de Canarias, 38200 La Laguna, Tenerife, Spain

The Very High Energy (VHE) BL Lac object Mrk 421 is object of a large multi-year multi-instrument campaign including VLBA, F-GAMMA, GASP-WEBT, Swift, RXTE, Fermi-LAT, MAGIC and Whipple, among other instruments and collaborations. This extensive radio to TeV gamma-ray data set provides an unprecedented temporal and energy coverage of this source, which allows for detailed studies on the evolution of the broad-band spectral energy distribution. We here report on the multifrequency lightcurves, temporal variability and correlations from the 4.5-months long campaign that took place in 2009. Mrk421 was relatively quiescent during the campaign without any major flares, however, the lightcurves show significant variability at all wavelenghts, being highest in the X-rays. We determined the power spectral densities (PSD) at most wavelengths and found that all PSDs can be described by simple power laws without break, the slopes being consistent with pink/red-noise behaviour. We discovered a correlation between VHE and X-ray fluxes with zero time lag. This behavior is common during flaring activity, but has not been observed for Mrk421 in low state.

T 85.7 Do 18:15 HSZ-E05

Detailed Study of the Broadband Emission of the classical TeV-blazar Mrk421 during Flaring Activity in March 2010 — •Shangyu Sun[1], David Paneque[1], and Andrea Boller[2] for the MAGIC-Collaboration — [1]Max Planck Institute for Physics, Munich, Germany — [2]Institute for Particle Physics, Swiss Federal Institute of Technology, Zurich, Swiss

We are performing an unprecedentedly long and dense monitoring of the broadband (radio to TeV) emission from the classical TeV blazar Mrk421. This object is among the brightest X-ray/TeV blazars in the

sky and among the few sources whose Spectral Energy Distribution (SED) can be completely characterized by the current instruments. This is a multi-year, multi-instrument program involving the participation of VLBA, Swift, RXTE, MAGIC, VERITAS, F-GAMMA, GASP-WEBT, and other collaborations and instruments which are providing the most detailed temporal and energy coverage on this source to date. At the conference we will report about the flaring activity observed in March 2010. We will show that the complete SED can be resolved on timescales of one day, which allows for unprecedented studies on the temporal evolution of the broadband emission of this object. We found that, even though a one-zone Synchrotron Self-Compton model can describe reasonably well the evolution of the SEDs, it is more appropriate to use a model with two blobs: one blob (with fixed parameters) describing the quiescent emission, and the other (10 times smaller) blob describing the flaring activity.