

T 2: Gammaastronomie 1

Zeit: Montag 11:00–12:35

Raum: P2

Gruppenbericht

T 2.1 Mo 11:00 P2

Status and recent results of the MAGIC telescope system — ●DOMINIK ELSÄSSER for the MAGIC-Collaboration — Lehrstuhl für Astronomie, Universität Würzburg

MAGIC is a system of two 17m Imaging Air Cherenkov Telescopes located at the Roque de Los Muchachos Observatory on the Canary Island La Palma. In 2011 and 2012, MAGIC underwent major upgrades to make the system more homogeneous by providing both telescopes with identical cameras, trigger and readout electronics, and to boost the overall sensitivity. MAGIC is now a unique detector for the energy range between 50GeV and a few tens of TeVs. In this talk, we present recent scientific highlights from both galactic and extragalactic observations, and give an overview over the status and future plans for the system.

T 2.2 Mo 11:20 P2

Langzeitbeobachtung des Blazars Markarian 421 mit MAGIC-I — ●ANN-KRISTIN OVERKEMPING für die MAGIC-Kollaboration — Experimentelle Physik 5, TU Dortmund

Die zwei MAGIC Teleskope beobachten hochenergetische Gamma-Strahlung u.a. von Blazaren, Galaxien mit aktivem Kern, deren relativistischer Jet auf den Beobachter gerichtet ist. Besonders der Blazar Mrk421 stellt ein gutes Untersuchungsobjekt dar, da er in hohen Energiebereichen eine hohe Flussdichte liefert.

In diesem Vortrag geht es um die Beobachtungen dieser Quelle zwischen 2007 und 2009, welche mit dem MAGIC-I Teleskop durchgeführt wurden. Der aktuelle Stand der Analyse wird vorgestellt, bei der die Gamma-Flussstärke sowie die spektrale Energiedichte im zeitlichen Verlauf der Beobachtungsperiode untersucht werden.

T 2.3 Mo 11:35 P2

Unprecedented study of the Broadband Emission of Mrk421 during Flaring Activity in March 2010 — ●SHANGYU SUN for the MAGIC-Collaboration — Max-Planck-Institute for Physics, Munich, Germany

Mrk 421 is one of the brightest blazars at X-ray and very high energies (VHE; > 100 GeV) in the sky. Its spectral energy distribution (SED) can be accurately characterized by current instruments because of its proximity, and therefore this object is one of the best object to study the nature of BL Lac objects. In the presentation, I will report on flaring activity occurring on March 2010 where we were able to achieve good coverage from radio to VHE energies on day timescale during the 13 consecutive days. We model the day-scale SEDs by synchrotron self-Compton (SSC) models and investigate the emission mechanism and temporal evolution of this source. These observations revealed that the correlation between the X-ray flux in the 2-10 keV band and VHE γ -ray flux above 200 GeV is close to a linear trend, which is expected in the synchrotron self-Compton (SSC) models where the > 200 GeV emission is produced by inverse-Compton scattering occurring in the Klein-Nishina regime. I will also show that the two-zone SSC scenario is more suitable for describing the evolution of the flaring activity because of the better fit to the measured SED data, the shorter time scales (1 hour vs. 1 day), and because of the correlated variability in X-ray and gamma-ray bands without correlated optical/radio variability, which is more naturally explained if the emission from these energy bands come from separate regions.

T 2.4 Mo 11:50 P2

Outstanding flaring activity from Markarian 421 in Very High Energy Gamma-rays detected with the MAGIC Telescopes in April 2013 — ●FRANCESCO BORRACCI for the MAGIC-Collaboration

— Max-Planck-Institut für Physik, Föhringer Ring 6, 80805 München, Germany

Among the extragalactic gamma-ray emitters discovered so far (55 sources in total, since the beginning of Cherenkov astronomy), Markarian 421 (hereafter Mrk421) is one of the closest ($z=0.03$) and brightest source, and hence one of the VHE objects that we can study best. Being also bright in X-rays, Mrk421 is among the few extragalactic sources whose Spectral Energy Distribution (SED) can be completely characterized by current instruments. Since 2009, Mrk 421 is yearly observed during 6 months with more than 25 instruments in the framework of extensive multi-wavelength campaigns. Here we report an outstanding flaring activity of Mrk 421 in April 2013, in which we detected the highest VHE flux ever measured for this source. Moreover, Mrk421 showed an extreme brightening in X-rays, up to flux levels that have not been observed before for this object as well. In my presentation I will report about the temporal evolution of the entire SED, with focus on the TeV/X-rays variability and correlation, and discuss the scientific implications. This flaring episode lasted several days and was covered simultaneously with various optical telescopes, X-rays satellites (Swift, NuSTAR), and gamma-ray instruments (Fermi-LAT, MAGIC and VERITAS).

T 2.5 Mo 12:05 P2

Discovery of Very High Energy Gamma-Ray Emission from MS1221.8+2452 with the MAGIC Telescopes — ●FRANCESCO BORRACCI for the MAGIC-Collaboration — Max-Planck-Institut für Physik, Föhringer Ring 6, 80805 München, Germany

MAGIC spends a sizable fraction of the observing time on searches for new gamma-ray sources. The first extragalactic source identified as gamma-ray emitter was Mrk421 ($z=0.031$), which was discovered with the Whipple IACT in 1992. Since then, 55 extragalactic sources have been detected at VHE. Most of the extragalactic gamma-ray emitters discovered so far belong to a particular class of galaxies, so called blazars, in which almost half of the entire non-thermal broadband emission (from radio to gamma-rays) is released at gamma-ray energies, $E > 100$ MeV. Here we report the discovery of a new VHE gamma-ray blazar MS1221.8+2452 ($z=0.218$) with the MAGIC Telescopes. The source was observed with MAGIC from March 2013 till May 2013 for a total of 20 hours, resulting in the detection with a statistical significance of 6 standard deviations. The VHE flux of this detection has been estimated to be about 2.5% of the gamma-ray flux from the Crab Nebula above 100 GeV. MS1221.8+2452 was also observed in the framework of a multi-wavelength campaign, providing the simultaneous broadband spectral coverage of the source. We will discuss the results of these observations in order to characterize the broadband spectral distribution (SED) and its impact for the theoretical models that aim to explain the gamma-ray emission in VHE blazars.

T 2.6 Mo 12:20 P2

Probing transient TeV emission from the Galactic Centre — ●HELEN POON and FRANCOIS BRUN — Max Planck Institut für Kernphysik, Heidelberg, Germany

In order to test for variability of very-high energy gamma-ray sources, a set of tests has been developed. Those statistical tests, presented in this talk, are based on the time intervals between individual events detected by the H.E.S.S. instrument. They can allow the detection of flares of TeV gamma-rays in astrophysical sources and, if a flare is detected, some of these tests can probe their timescales. In this talk, I am going to show the results obtained with this set of tests on the Galactic Centre.