

# *The Blazar Times*

A Research Newsletter Dedicated to the BL Lac and Blazar Phenomena

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### *Journal Abstracts*

#### **PKS 0537-441: extended [O II] emission and a binary QSO?**

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We present high-resolution imaging and low-resolution spectroscopy of the BL Lac object PKS 0537-441 ( $z = 0.893$ ) and its environment carried out with the ESO-NTT and VLT telescopes. The observations were designed to clarify, whether the properties of PKS 0537-441 are affected by gravitational microlensing due to the claimed detection of a galaxy along the line-of-sight to the BL Lac, or whether PKS 0537-441 and its environment act as a lensing system itself, as suggested by the detection of several closely companion galaxies with similar morphologies close to PKS 0537-441.

Our observations show that neither case seems to be likely. Within our images we did not find a galaxy along the line-of-sight to the BL Lac as claimed previously. In addition, our spectroscopy shows that none of the four closest companion galaxies (including one new detection by us) is at high redshift. Instead, two of the four nearby companion galaxies to PKS 0537-441 are within 200 km/s of the systemic velocity of the BL Lac ( $z = 0.892$  and  $0.895$ , respectively). The third companion galaxy is at higher redshift ( $z = 0.947$ ). The fourth companion galaxy shows evidence of Mg II absorption redwards of its systemic velocity and is perhaps a mini low-ionization BAL QSO at  $z = 0.885$ . If the latter can be confirmed, PKS 0537-441 is the first BL Lacertae object being a member of a binary Quasar.

While we do not find (micro)lensing effects being important for this source or its environment, our observations revealed a highly interesting feature. We detected extended [O II] emission in the off-nuclear spectrum of PKS 0537-441, which is most likely due to photoionization from the active nucleus, although we can not rule out the possibility that the extended emission is due to jet-cloud interaction with the counterjet of PKS 0537-441.

According to our analysis of the photometric data, PKS 0537-441 seems to be located in a cluster environment as rich as Abell type 0-1. This is supported by the detection of four galaxies in the field with similar redshifts as the BL Lac ( $\Delta z < 0.002$ ). However, we found serendipitously even more galaxies at somewhat higher redshifts ( $z = 0.9-1$ ). Thus, PKS 0537-441 might be located in front of a galaxy cluster at somewhat higher redshift or even be part of a large-scale structure with an extension towards the BL Lac.

Accepted by A&A

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For preprints via ftp or WWW: astro-ph/0305401

## Detection of TeV Gamma-Rays from the BL Lac 1ES1959+650 in its low states and during a major outburst in 2002

The HEGRA Collaboration (<http://www-hegra.desy.de/hegra>):

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TeV  $\gamma$ -rays from the BL Lac object 1ES1959+650 have been measured during the years 2000 and 2001 with a significance of  $5.2\sigma$  at a value of 5.3% of the Crab flux and in May 2002 during strong outbursts with  $> 23\sigma$  at a flux level of up to 2.2 Crab, making 1ES1959+650 the TeV Blazar with the third best event statistics. The deep observation of 197.4h has been performed with the HEGRA stereoscopic system of 5 imaging atmospheric Cherenkov telescopes (IACT system). 1ES1959+650 is located at a redshift of  $z = 0.047$ , providing an intermediate distance between the nearby Blazars Mkn 421 and Mkn 501, and the much more distant object H1426+428. This makes 1ES1959+650 an important member of the class of TeV Blazars in view of the absorption of TeV photons by the diffuse extragalactic background radiation (DEBRA). The differential energy spectrum of 1ES1959+650 during the flares can be fitted by a power law with a spectral index of  $2.83 \pm 0.14_{\text{stat}} \pm 0.08_{\text{sys}}$  or by a power law with an exponential cut-off at  $(4.2^{+0.8}_{-0.6} \pm 0.9_{\text{stat}}) \text{ TeV}$  and a spectral index of  $1.83 \pm 0.15_{\text{stat}} \pm 0.08_{\text{sys}}$ . The low state differential energy spectrum obtained with lower statistics can be described by a pure power law with a spectral index of  $3.18 \pm 0.17_{\text{stat}} \pm 0.08_{\text{sys}}$ .

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For preprints via WWW: <http://arXiv.org/abs/astro-ph/0305275>

## *Abstract Guidelines*

Abstracts for “The Blazar Times” are solicited for papers that have been recently accepted for publication by a refereed journal, and for recent Ph.D. theses. Please do not submit an abstract before it has been accepted, nor after it is published. Abstracts from papers which are not refereed (e.g., conference proceedings) are not accepted.

The subject matter should pertain directly to the BL Lac and/or blazar phenomenon in general. Both observational and theoretical abstracts are appropriate. Abstracts from papers dealing with other classes of AGN will generally not be included unless they explicitly discuss their relevance to the blazar phenomenon; however exceptions to this rule will be considered.

A monthly call for abstracts will be issued and abstracts received by the last day of the month will usually appear in the following month’s newsletter. Announcements of general interest to the BL Lac and blazar communities may also be submitted for posting in the newsletter. These might include (but are not restricted to) the following: (i) *Job Openings* directed toward blazar researchers, (ii) announcements of *Upcoming Meetings*, (iii) announcements of *Upcoming Observing Campaigns* for which participation is solicited from the community at large, (iv) reviews of *New Books*, and (v) *General Announcements* that provide or request research-related information.

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`http://www.aoc.nrao.edu/~trector/blazar/`

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