The Blazar Times

A Research Newsletter Dedicated to the BL Lac and Blazar Phenomena

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Job Announcement

Postdoctoral Fellowship - AGN Jets

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The Joint Center for Astrophysics at the University of Maryland, Baltimore County, invites applications for a Postdoctoral Fellow position beginning in 2004. The successful applicant will work with Dr. Eric Perlman and collaborators on multi-waveband observations of AGN jets. Research work will include the reduction of data from the HST, Chandra, and the VLA, modeling of jet physics, as well as preparation of observing proposals and the implementation of observing programs.

The candidate should have experience with X-ray, optical and/or astronomical data analysis methods and analysis packages (e.g.,IRAF/PyRAF, FTOOLS, CIAO, XSPEC, AIPS), and should be proficient in scientific programming. The position requires a Ph.D. in Astronomy, Physics or a closely related field. The initial appointment will be for one year, with renewal for up to two more years possible subject to funding.

For full consideration completed applications should be received before December 31, 2003, although applications will be reviewed until the position is filled. Applicants should submit their CV, bibliography, statement of research interests, and the names and contact information for three references to:

Joint Center for Astrophysics Physics Department University of Maryland, Baltimore County 1000 Hilltop Circle Baltimore, MD 21250 USA

Inquiries should be addressed to Dr. Eric Perlman at perlman@jca.umbc.edu or 410-455-1982. Information about the Joint Center for Astrophysics, a collaboration between UMBC and NASA's Goddard Space Flight Center, can be found at http://jca.umbc.edu. UMBC is an AA/EOE.

To Appear in October AAS Job Register

Journal Abstracts

Near-Infrared Observations of BL Lacertae Host Galaxies

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Multi-band near-infrared images of twelve BL Lacertae objects were obtained with the 2.5m telescope at the Las Campanas Observatory in order to determine the properties of their underlying host galaxies. Resolved emission was clearly detected in eight of the lowest redshift targets (up to $z \sim 0.3$), and was modeled with a de Vaucouleurs $r^{1/4}$ surface brightness law. We find that the morphologies match the elliptical galaxy profiles well, and that the BL Lac objects reside in large and luminous, but otherwise normal hosts – consistent with previous studies done predominantly at optical wavelengths. The median absolute K-band magnitude of the galaxies in this study is –26.2, the average half-light radius is 4.2 ± 2.3 kpc, and their average integrated $R-K$ color is 2.7 ± 0.3 mag. These are well within the range of values measured previously in the H-band by Kotilainen et al. and Scarpa et al. in a comparable number of targets. Taking their data together with our results, we find a best-fit K-band Kormendy relation of $\mu_e = 4.3 \log_{10}$ (r_e/kpc) +14.2 mag arcsec^{-2}, virtually identical to that obtained for normal ellipticals. Finally, the near-infrared colors determined for five galaxies (average $J-K = 0.8 \pm 0.3$ mag) are the first such measurements for BL Lac hosts, and match those expected from old stellar populations at the BL Lac redshifts.

Accepted by ApJ

For preprints contact: ccheung@brandeis.edu

For preprints via ftp or WWW: http://arXiv.org/abs/astro-ph/0308420

The hard X-ray view of the low-luminosity blazar in the radio galaxy NGC 6251

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We present results from a BeppoSAX (July 2001) observation of the FR I radio galaxy NGC 6251, together with a re-analysis of archival ASCA (October 1994) and *Chandra* (September 2000) data. The weak detection above 10 keV and the lack of iron fluorescent K_α emission lines in the BeppoSAX spectrum rule out that the bulk of the X-ray emission is due to an obscured Seyfert nucleus. The study of the multiwavelength spectral energy distribution suggests instead that X-rays probably originate as inverse-Compton of synchrotron seed photons in a relativistic jet, indicating that NGC 6251 hosts a low radio luminosity ($L_{5\ \mathrm{GHz}} \sim 10^{40}$ erg s^{-1}) blazar. The BeppoSAX spectrum is flatter than in the earlier ASCA observation. This might be due to the emergence of a different spectral component during phases of lower X-ray flux. In this context, we discuss some possible explanations for the intense and mildly-ionized fluorescent iron line measured by ASCA.

Accepted by A&A

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Variability of EGRET Gamma-Ray Sources

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The variability of the high-energy gamma ray sources in the Third *EGRET* catalog is analyzed by a new method. We re-analyze the *EGRET* data to calculate a likelihood function for the flux of each source in each observation, both for detections and upper limits. These functions can be combined in a uniform manner with a simple model of the flux distribution to characterize the flux variation by a confidence interval for the relative standard deviation of the flux. The main result is a table of these values for almost all the cataloged sources. As expected, the identified pulsars are steady emitters and the blazars are mostly highly variable. The unidentified sources are heterogeneous, with greater variation at higher Galactic latitude. There is an indication that pulsar wind nebulae are associated with variable sources. There is a population of variable sources along the Galactic plane, concentrated in the inner spiral arms.

Accepted by ApJ

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For preprints via ftp or WWW: http://www.arxiv.org/abs/astro-ph/0307188

Microvariability in the optical polarization of 3C279

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We present results of a microvariability polarization study in the violently variable quasar 3C279. We have resolved the polarization curves in the V band for this object down to timescales of minutes. We found two main components in the evolution of the degree of linear polarization, one consisting of a flicker with timescales of several tens of minutes and other component with far more significant variations on timescales of a few days. The linear polarization descended from $\sim$ 17 % down to $\sim$ 8 % in three nights. The polarization angle underwent a sudden change of more that 10 degrees in a few hours, perhaps indicating the injection of a new shock in the jet. The amplitude of the intranight flickering in the degree of polarization is at the level of $\sim 1\%$. These are probably the best sampled polarization data ever obtained for this object. We also performed IR observations and we provide a follow-up of the evolution of this source at such energies after the main polarization outburst

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The Central Engines of Blazars

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We have assembled a sample of 37 radio-loud quasars that have been imaged with the *Hubble Space Telescope* in order to investigate their black hole masses, accretion rates, and the structure of their accretion disks. The black hole masses were estimated from the luminosities of the host galaxies, and the accretion powers were extrapolated from the emission-line luminosities. The majority of the quasars have masses in the range $M_{\rm BH} \approx 10^8 - 10^9 M_{\odot}$. Their accretion rates, $\dot{M} \approx 0.01 - 1$ times the Eddington rate, suggest that most of the objects possess standard optically thick, geometrically thin accretion disks, in some cases perhaps accompanied by an optically thin advection-dominated component. The coexistence of strong radio emission and a standard disk conflicts with recent models for jet formation. We discuss modifications of the standard model that can resolve this discrepancy. We find there is a strong correlation between the accretion rate and the extended radio luminosity. This lends support to the idea that the extended radio emission is somehow linked to the accretion disk. Lastly, we combine the present sample of radio-loud quasars with the sample of BL Lac objects studied by Wang, Staubert, & Ho (2002) to reevaluate the unification picture for radio-loud

active galactic nuclei. Consistent with current ideas for the unification of radio-loud sources, we find that flat-spectrum radio quasars and FR II radio galaxies indeed seem to belong to the same population, as do BL Lac objects and FR I radio galaxies on the opposite end of the luminosity spectrum. However, some members of the low frequency-peaked BL Lac objects may be more closely associated with FR II rather than FR I radio galaxies. We describe how the various subclasses of radio-loud sources can be viewed as a continuous sequence of varying accretion rate.

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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://hosting.uaa.alaska.edu/aftar/blazar/`

Abstracts which are not in this template format cannot be accepted. Both templates are stand-alone LaTeX documents; and I ask that you compile them with LaTeX to check for any errors before submitting. This will save me tremendous efforts in solving any problems; and will assure that your abstract will appear in the newsletter as you had intended. Important: If you use any specially defined characters be sure to include their definitions as well.