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From the Editor

The Active Galaxies Newsletter is produced monthly. The deadline for contributions is the last friday of the month. The Latex macros for submitting abstracts and dissertation abstracts are appended to each issue of the newsletter and are also available on the web page.
Rob Beswick

Abstracts of recently accepted papers

Strong Gravitational Lensing and the Structure of Quasar Outflows

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We show that by analyzing the spectra of lensed broad absorption line quasars (BALQSOs), it is possible to reveal key properties of the outflowing gas in the inner regions of these objects. This results from the fact that each image of the quasar corresponds to a different line of sight through the outflow. This combined with dynamical estimates for the location of the flow, adds new information concerning the lateral, non line of sight structure of the absorbing gas. Here we consider a sample of lensed BALQSOs and note that the similarity of BAL profiles of different images of the same quasar implies that the flow is relatively isotropic on small scales. We show that its geometry is inconsistent with the ballistically accelerated spherical cloud model, and that wind models provide a better description of the flow structure. Furthermore, observations seem to disagree with naive interpretations of recent time-dependent wind simulations. This may hint on several important physical processes that govern the structure and dynamics of such flows. Future prospects for the study of quasar outflows with the effect of strong gravitational lensing are discussed.

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preprint available on astro-ph/0308285

A Search for Very Extended Ionized Gas in Nearby Starburst and Active Galaxies

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We report the results from a pilot study of 10 nearby starburst and active galaxies conducted with the Taurus Tunable Filter (TTF) on the Anglo-Australian and William Herschel Telescopes. The main purpose of this imaging survey is to search for warm emission-line gas on the outskirts (galactocentric distances $R > 10$ kpc) of galaxies to provide direct constraints on the size and geometry of the "zone of influence" of these galaxies on their environment. Gaseous complexes or filaments larger than ~ 20 kpc are discovered or confirmed in six of the galaxies in the sample (NGC 1068, NGC 1482, NGC 4388, NGC 6240, NGC 7213, and MR 2251–178). Slightly smaller structures are seen for the first time in the ionization cones and galactic winds of NGC 1365, NGC 1705, Circinus galaxy, and ESO484-G036. The TTF data are combined with new optical long-slit spectra as well as published and archived radio and X-ray maps to constrain the origin and source of ionization of these filaments. A broad range of phenomena is observed, including large-scale ionization cones and galactic winds, tidal interaction, and ram-pressure stripping by an intracluster medium. The source of ionization in this gas ranges from shock ionization to photoionization by the central AGN or in-situ hot young stars. The sample is too small to draw statistically meaningful conclusions about the extent and properties of the warm ionized medium on large scale and its relevance to galaxy formation and evolution. The next generation of tunable filters on large telescopes promises to improve the sensitivity to faint emission-line fluxes at least tenfold and allow systematic surveys of a large sample of emission-line galaxies.

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XMM-Newton Observation of Fe Kα emission from a BAL QSO: Mrk 231

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We present results from a 20 ksec *XMM-Newton* observation of Mrk 231. EPIC spectral data reveal strong line emission due to Fe Kα, which has rarely been detected in this class, as BAL QSOs are very faint in the X-ray band. The line energy is consistent with an origin in neutral Fe. The width of the line is equivalent to a velocity dispersion $\sim 18,000$ km s^{-1} and thus the line may be attributed to transmission and/or reflection from a distribution of emitting clouds. If, instead, the line originates in the accretion disk then the line strength and flat X-ray continuum support some contribution from a reflected component, although the data disfavor a model where the hard X-ray band is purely reflected X-rays from a disk. The line parameters are similar to those obtained for the Fe Kα line detected in another BAL QSO, H1413 + 117.

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Near-IR spectroscopy of PKS1549-79: a proto-quasar revealed?

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We present a near-IR spectrum of the nearby radio galaxy PKS1549-79 (z = 0.153). These data were taken with the aim of testing the idea that this object contains a quasar nucleus that is moderately extinguished, despite evidence that its radio jet points close to our line-of-sight. We detect broad Paα emission (FWHM 1745 $\pm$ 40 km s^{-1}), relatively bright continuum emission, and a continuum slope consistent with a reddened quasar spectrum ($3.1 < A_V < 7.3$), all emitted by an unresolved point source. Therefore we conclude that we have, indeed, detected a hidden quasar nucleus in PKS1549-79. Combined with previous results, these observations are consistent with the idea that PKS1549-79 is a young radio source in which the cocoon of debris left over from the triggering events has not yet been swept aside by circumnuclear outflows.

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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 $\mu_e = 4.3 \log_{10} (r_e/\mathrm{kpc}) + 14.2$ 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.

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Evolution of the Nuclear Accretion Disk Emission in NGC 1097: Getting Closer to the Black Hole

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We study the evolution of the broad, double-peaked Hα emission-line profile of the LINER/Seyfert 1 nucleus of NGC 1097, using 24 spectra obtained over a time span of 11 yrs — from 1991 Nov. through 2002 Oct. While in the first 5 yrs the main variation was in the relative intensity of the blue and red peaks, in the last years we have also observed an increasing separation between the two peaks, at the same time as the integrated flux in the broad line has decreased. We propose a scenario in which the emission originates in an asymmetric accretion disk around a supermassive black hole, whose source of ionization is getting dimmer, causing the region of maximum emission to come closer to the center (and thus to regions of higher projected velocity). We use the observations to constrain the evolution of the accretion disk emission and to evaluate two models: the elliptical disk model previously found to reproduce the observations from 1991 to 1996 and a model of a circular disk with a single spiral arm. In both models the peak emissivity of the disk drifts inward with time, while the azimuthal orientation of the elliptical disk or the spiral pattern varies with time. In the case of the spiral arm model, the whole set of data is consistent with a monotonic precession of the spiral pattern, which has completed almost two revolutions since 1991. Thus, we favor the spiral arm model, which, through the precession period implies a black hole mass that is consistent with the observed stellar velocity dispersion. In contrast, the elliptical disk model requires a mass which is an order of magnitude lower. Finally, we have found tentative evidence of the emergence of an accretion disk wind, which we hope to explore further with future observations.

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