most of these have [OII] emission lines with equivalent widths of a few angstroms. Five of the six nearest galaxies were detected with the IPC. For a given optical luminosity, the x-ray luminosity (or limit) of the radio-emitting ellipticals is generally somewhat greater than the greatest x-ray luminosity found among radio-quiet ellipticals. The detected radio-emitting ellipticals have $2 \times 10^{46}$ erg s$^{-1}$ $< L_x < 2 \times 10^{47}$ erg s$^{-1}$ and $2 \times 10^{44} < L_b/L_{(0.5keV)} < 2 \times 10^{45}$.

Most of the active elliptical galaxies may simply have more luminous halo gas (Norman and Silk) or coronal gas (Mushotzky, Stewart, and Fabian) than radio-quiet ellipticals have. Alternatively, they may be unusually luminous due to inverse Compton radiation from high energy electrons or from the hard bremsstrahlung from a hot plasma associated with the nuclear emission line region. NGC 1407 has a resolved x-ray source with FWHM $\sim 15$ kpc, which is apparently associated with an x-ray source. NCG 3898 has an exceptionally powerful source with $L_x = 2 \times 10^{46}$ erg s$^{-1}$, which is probably associated with the active nucleus.

04.04 Soft X-Ray Active Galactic Nuclei, S. H. PRAVDO, JPL, F. E. MARSHALL, GSFC.

We report the discovery of ten active galactic nuclei (AGN) based on optical observations. The new objects are similar to AGN that have been identified by others with this technique. One notable exception, the quasar B1821+643, is associated with a previously unidentified x-ray source detected in the X-band radio survey of the ROSAT all-sky experiment. It is thus one of a small number of AGN which are more intense in soft x-rays than in hard x-rays during 1977-87. X-rays were also detected from two other quasars, known previously at other wavelengths.

04.05 The Einstein X-ray Observatory HRI Deep Survey in Ursa Minor, R. I. BURG, J. HUCHRA, F. A. PRIMINI, R. SHIELD, J. L. MURRAY, CPA, AND R. GLACCONI, ESA. - We have completed the analysis of the deepest (5500 seconds), high angular resolution, Einstein x-ray observation. This was taken while the Observatory was pointed to a field in Ursa Minor. We achieved a limiting sensitivity for source detection of 2.3 $\times 10^{-4}$ c/s, corresponding to a flux limit of $1.6 \times 10^{-14}$ ergs cm$^{-2}$ s$^{-1}$ in the 1-3 keV energy band assuming a background power law spectrum. This is comparable to that previously obtained at lower angular resolution in Einstein IPC deep surveys. We detect 4 sources above the 5s significance level (8 sources $> 50$), with positions accurate to $< 3$ arc seconds (90% confidence). The observed 5s source density agrees with that expected from published source-count relationships. An optical search in each field, to a limiting magnitude $M_b = 21$, yield one and only one counterpart per source. Spectra of these optical candidates have been obtained with the MMT. These are presented and the nature of the objects is discussed.


We present near-infrared JHK photometry for 40 radio galaxies and 8 quasars from the complete sample of mJy radio sources in the Leiden-Berkeley Deep Survey. The detection rate is 48 out of 52 attempted objects down to K=17.75. The visual-infrared colors of faint radio galaxies are independent of their radio flux and power of about two-thirds of the mJy radio galaxies are consistent with those of distant ($z \geq 0.2$) luminous ($M_r \leq -23$) giant elliptical galaxies. Among the giant elliptical population, about one half of the galaxies have colors consistent with non-evolving models or models in which star formation is completed in the first billion years. A mildly evolving giant ($M_r = -23$) elliptical model spectrum ($\mu \geq 0.5$) can fit the other half. The remaining third of the mJy galaxies are much bluer and can be explained by lower luminosity ($M_r = -20$), nearer ($z \leq 0.2$) spiral or elliptical (0.01 $\leq \mu \leq 0.5$) galaxies or by a population of bright ($M_r = -23$) galaxies undergoing active star formation (0.01 $\leq \mu \leq 0.2$) beyond a redshift of $\sim 0.2$ or a combination thereof. The fraction of a very red mJy radio galaxies, with non-thermal infrared emission, is small ($\sim 0.05$). The infrared and visual-infrared colors of the quasars are consistent with non-thermal components in the infrared and blue parts of their spectrum.

04.07 Ground-Based Studies of IRAS Sources, E. E. BECKLIN, O. D. BURG, J. R. BEASLY, O. F. LESTER, C. W. WYNNS-WILLIAMS, INST. FOR ASTRONOMY, U. OF HAWAII. - We report the initial results of a program of ground-based follow-up studies of IRAS sources at Mauna Kea. These studies include 1.2-20 $\mu$m photometry, CCD imaging at V, R, I, and 1.01 $\mu$m wavebands, and grism spectroscopy in the 5000-7000 $\AA$ region. Searches at 10 and 20 $\mu$m with the IRTF yielded detections of 9 out of 9 objects selected from the 3rd preliminary IRAS list. Seven of these are clearly galaxies in the CCD images; in five cases we find strong H$\alpha$ emission with redshifts of 0.01 to 0.03. CCD images of another show two compact, possibly stellar components surrounded by faint extended emission. Its red spectrum shows no emission features. The last object of the nine objects is probably Galactic.

04.08 Simulations of Multiple Mergers in Galactic Nuclei, M. J. DUCAN, U. OF TORONTO. - Direct N-body simulations are used to study the dynamical evolution of 1) the central regions of a massive galaxy as a dense satellite star system spirals in and merges under the influence of dynamical friction and 2) the evolution of systems containing multiple nuclei within a diffuse core. The results of the simulations are compared with dE galaxies and peculiar clusters such as V Zw 311.

04.09 Extinction in the Central Regions of M82, A. MONEZI, W. J. FORREST, J. L. RIPPER, C. A. WOODWARD, L. ROCHEREAU.

Infrared images of M82 at H(1.65$\mu$m) and K(2.2$\mu$m)