11.09
Candidate High Redshift Clusters Around Radio Loud Quasars
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We report results of an r and K band imaging survey of radio-loud quasars (RLQs) at z=0.6-2.0.

It is known that the environments of luminous RLQs evolve rapidly with redshift: at z=0.6 such RLQs are often found in Abell richness 0-1 clusters, but at z>0.5 they are never found in such rich environments. This indicates that the evolution of quasars is tied to their environments. The outstanding feature of quasar evolution is the huge decline in space density from z=2 to z=0, but almost nothing is known of quasar environments at z>0.7. To investigate RLQ environments to high redshift and to assemble and study a sample of high-redshift galaxies, we have searched for galaxies and clusters around a carefully selected sample of RLQs with 0.6<z<2.0.

Candidate clusters are detected by a contrast in the number density and/or color of galaxies around the quasars. Several clusters of Abell richness 0–1 have been found at z<1, and five at z=1.4-1.7. All z<1.5 candidates include extremely red galaxies with colors consistent with early-type galaxies already >3 Gyr old. Such galaxies can potentially constrain the cosmology by requiring high ages for the universe at large lookback times.

These candidate z<1.5 clusters are being studied in detail with ongoing multicolor imaging, upcoming optical and IR spectroscopy, and proposed HST observations. These data will provide photometric and spectroscopic redshifts and will measure the color, color-magnitude slope, and scatter in the 'red envelope' of early-type galaxies in the color-magnitude diagram and thus constrain the formation epoch, differential evolution, and coevality of such galaxies, respectively, within a cluster and between different clusters at z<1.5. These z<1.5 cluster candidates provide excellent tests of the coevality of early-type cluster galaxies, since such tests are more sensitive to the closer to the formation epoch they are performed.

11.02
A Comparison of X-ray and Radio Observations of NGC 7331
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We have made deep observations of NGC 7331 using ROSAT and the VLA, at 6 cm and 20 cm. Locations of x-ray and radio sources in the field are compared to previously identified radio and optical sources. X-ray luminosities for identified sources are given and x-ray fluxes are given for unidentified sources. The nucleus of NGC 7331 has been analyzed to discern any new evidence supporting the presence of a massive black hole (MBH). Comparisons are made with other similar sources.

Work supported by NASA Grant NAG5-3214

11.03
ISO Observations of Hot Dust in the Nucleus of the S0 Galaxy NGC 3998

ISOCAM maps of the Seyfert 1 S0 galaxy NGC 3998 between 4.5μm and 15μm detect both extended emission from the bulge stars and strong point source emission from the nucleus. The inner regions of NGC 3998 appear to contain a few thousand solar masses of warm (~200 K) dust, probably associated with the AGN.

11.04
NGC 4258: A Compact Central Infrared Source Revealed
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We present high resolution (~0.6") near infrared Keck observations which probe the optically obscured nucleus of NGC 4258 (M 106) which is believed to contain a massive black hole. The images show a compact central source at H (1.65μm) and K (2.23μm) after the J (1.25μm) component, which was taken to be dominated by the bulge stars, was subtracted out. The compact source has a measured K flux of ~3 mJy and might be marginally resolved. When corrected for AV~20 mag of extinction the IR luminosity (1.5μm-3.0μm) is ~3x10^9 L_☉. The corresponding X-ray (2-10 keV) luminosity is ~10^7 L_☉, while the central source has been estimated at ~10^6 L_☉ in the radio. We argue that our near infrared source is a spherical dust shell around the center which is reprocessing the radiation emitted by the black hole inferred to be at the center.

11.05
Discovery of the Hidden Seyfert 1 Nucleus in Markarian 463

Hubble Space Telescope imaging polarimetry of the Seyfert 2 galaxy Markarian 463 E has revealed the location of an obscured Seyfert 1 nucleus. Curiously, the Seyfert 1 is not co-spatial with the optically bright Seyfert 2, but is located 1' (~1 kpc) to the south, at the tip of what was previously thought to be an optical jet. The high spatial resolution broad-band UV imaging achieved with the Faint Object Camera reveals a distinct cone of highly polarized (13 ± 3 %) light fanning northward from the obscured nucleus. The magnetic polarization vectors point at the cone's apex, indicating that the wedge of illuminated material (opening angle ~ 70°) is the scattering mirror that allows us to see the Seyfert 1 core.