niques or other selection techniques which are redshift sensitive) with the list of objects related to QSOs but with the majority having much smaller redshifts (Hewitt and Burbidge 1991) has been carried out by J.V. Narlikar's group and they have found again that a period close to $\triangle z = 0.06$ which was found by one of us long ago (Burbidge 1968) is still highly significant.

Hewitt, A. and Burbidge, G. 1991 *Ap.J. Suppl.* **75**, 297.
Burbidge, G. 1968, *Ap.J. (Letters)* **154**, L41.

15.03
Unification of Radio Galaxies and Quasars

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The rapid variability, polarization, and superluminal motion of flat-spectrum radio quasars (FSRQ) suggests they may be dominated by relativistically beamed emission. The counterpart sources whose emission is beamed at larger angles to the line of sight may be identified with steep-spectrum radio quasars (SSRQ) and high-luminosity radio galaxies. We evaluate such a scheme quantitatively by comparing the number densities and luminosities of the separate populations, taking into account the strong selection effects introduced by relativistic beaming. First we make a model independent determination of the luminosity functions of the three separate classes. Then we make model dependent calculations of the predicted beamed luminosity functions for FSRQs and SSRQs. We find excellent agreement with the beaming hypothesis for a distribution of Lorentz factors $5 \lesssim \gamma \lesssim 40$ (skewed toward lower values) that is commensurate with the observed superluminal velocities. Our model predicts that FSRQs have their radio axes within $\theta \sim 14°$ of the line of sight while SSRQs are in the range $14° \lesssim \theta \lesssim 40°$. The alternative hypothesis that FSRQs are the beamed version of SSRQs, with radio galaxies representing a separate class, does not fit the data as well.

15.04
ROSAT Spectra of Quasars with Substantial Redshifts

M. Elvis, B. J. Wilkes, H. Tananbaum (CfA), A. Lawrence (QMWC) and Jonathan McDowell (MSFC)

We present a first analysis of ROSAT PSPC spectra for five quasars, including three at z>0.5, one being at z=2.85. The quasars show a surprising range of spectral slopes: the two flat radio spectrum quasars have best fit power-law energy indices of ~ 0.6 and ~ 1.6 respectively while the remainder have slopes ~ 1. This spans the whole range previously thought to be occupied by both radio-loud and radio-quiet quasars based on low redshift (z<0.2) objects (Wilkes and Elvis 1987). At the redshifts of these quasars the ROSAT PSPC is sensitive to the emitted energy range 0.2-3 keV (0.4-8kev for the z=2.85 quasar). The highest redshift quasar has the flattest slope, consistent with that expected from synchrotron self-compton related to the radio emission. This suggests a strong energy dependence in spectral shape, perhaps due to the presence of a soft excess, or alternatively spectral evolution.
Wilkes, B. J. and Elvis, M. 1987 *ApJ* **323**, 243

15.05

High Energy Gamma Radiation from Quasar 3C279 Detected by the EGRET Telescope on the Compton Gamma Ray Observatory

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Intense gamma radiation has been observed from the direction of the OVV quasar 3C279 throughout the energy range from 30 MeV to over 5000 MeV by the Energetic Gamma Ray Experiment Telescope (EGRET) during the period 1991 June 15-28. Its spectrum is well represented by a photon differential power law exponent of 2.0 ± 0.1, with a photon intensity above 100 MeV of $(2.8 \pm 0.4) \times 10^{-6}$ cm^{-2} s^{-1}. 3C279 was not detected by either of the earlier high energy gamma ray telescopes SAS-2 or COS-B; comparison with SAS-2 and COS-B 2 sigma upper limits for E>100 MeV shows that there has been a large increase in high energy gamma ray intensity relative to the earlier times, as has been observed in the radio, infrared, optical, and X-ray ranges. This source is the most distant and by far the most luminous gamma ray source yet detected. Results will be presented from a search for intensity variations of the emission during the 13-day EGRET observation.

15.06
Ultraviolet HST Spectra of Three Small Redshift Quasars

J. N. Bahcall, B. Jannuzi, D. P. Schneider (IAS), G. Hartig (STScI)

We have analyzed high resolution FOS spectra of three small redshift quasars, PKS 0405-12, 3C 273, and H 1821 + 643. We present the measured absorption and emission lines and the identifications. The results are compared and used to make a preliminary estimate of the number density of relatively nearby Ly-α and metallic-line absorption systems.

15.07
ROSAT Spectra of Quasars with Substantial Redshifts