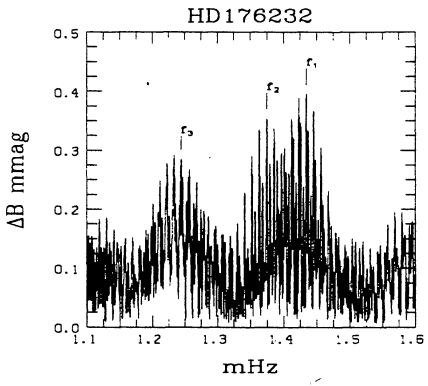
28.21

A New Rapidly Oscillating Ap Star in the Northern Hemisphere

C.H. Heller (Yale), K.S. Kramer (MLO/SDSU)

We monitored the star HD 176232 (HR 7167; 10 Aql), photometrically for ~ 25 hours over seven nights during July 1988 with the Mount Laguna Observatory one meter telescope. A frequency analysis of these observations show that at least three periodicities are present in the light variations and confirms the variability reported by Heller and Kramer (1987). The three frequencies have been tentatively identified as f_1 = 1.448 mHz, f_2 = 1.385 mHz, f_3 = 1.251 mHz and with semi-amplitudes of 0.39, 0.37, and 0.29 mmags respectively (see figure below). No rotational splitting was apparent. Other periodicities may be present, but because of their low amplitudes they can not be identified with confidence. Further observations, preferably from multiple sites, will be needed to fully determine the frequency structure of this low amplitude variable.



Session 29: Quasars and Continua of Active Galactic Nuclei
10:00–11:30 am, Salon E

29.01 (Dissertation)

Numerical Models of Lyα Clouds

G. Williger and R.F. Carswell (Inst. of Astronomy, Cambridge)

Numerical models of QSO Lyα absorption systems are presented. A one-dimensional spherically symmetric hydrodynamics code was employed, taking into account ionization balance, and thermal radiation and conduction, using estimates for background UV flux J_0 as a function of redshift from Bechtold *et al.*, 1987 (*Ap.J.* **315**, 180). Polytropes of negative index (Black 1981, *M.N.R.A.S.* **197**, 553) were tested in both static IGMs and ones comoving with the Hubble flow. Results are sensitive to the models used for the evolution of J_0 and the expansion of the IGM. For starting redshifts of $z = 4$, all polytrope central column densities by decline at least one order of magnitude by $z = 2$ due to expansion or increase in J_0. Column densities of HI, HeI and HeII, and Voigt profiles of H and He Lyα and β and HeI λ584 and λ537 were obtained for each simulation as functions of time and impact parameter. By weighting equivalent widths of Voigt profiles by impact parameter it was possible to create an equivalent width distribution to compare with observations. Other Lyα absorber models examined in this manner include King potentials perhaps in accord with cold dark matter scenarios and isothermal spheres.

29.02

Hot Ion Model for the X-Ray Spectra of Active Galactic Nuclei.

C. D. Dermer (Physics Department, Lawrence Livermore National Laboratory, Livermore, CA)

A magnetized, two-temperature ion/ electron plasma is analyzed under the assumption that the magnetic field energy density is in equipartition with the radiation field energy density. Coulomb coupling is the primary heating source of the electrons, and pion production from ion collisions provides an important source of soft photons through synchrotron radiation from pion-decay positrons when the ion temperature exceeds ~20 MeV. The two-parameter (ion temperature and Thomson depth) model gives a range of X-ray spectral indices and compactnesses in reasonable agreement with observations, as recently summarized by Lightman and Zdziarski [*Ap. J.*, **319**, 643, 1987].

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29.03

Hard X-ray Balloon Observations of Selected Active Galactic Nuclei

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Harvard-Smithsonian Center for Astrophysics

We present results from hard x-ray balloon observations of Active Galactic Nuclei (AGN) carried out by the Energetic X-ray Imaging Telescope Experiment (EXITE). EXITE is a coded-aperture telescope for x-rays in the energy range from 20 to 300keV, with an angular resolution of 20 arcmin in a 3.4° field-of-view. This angular resolution is sufficient to make clear distinctions between point-sources in crowded regions of the sky, like the Galactic Center. EXITE was successfully launched on a 28 m.cu.ft. balloon from Fort Sumner, NM, at 23:40 UT October 8, 1988, and remained at float altitude for 19 hours. Among several other x-ray sources, we observed the QSO 3C 273 and the Seyfert galaxy NGC 4151. We present EXITE imaging and spectral results for these AGNs. We also show 2-20 keV spectra obtained with the Einstein Observatory Monitor Proportional Counter (MPC), taking into account recently improved background determinations, for comparison with EXITE data.

29.04

Variability in the Steep X-ray Spectrum of the Quasar PG1211+143

Martin Elvis[1], *Paolo Giommi*[2], *Jonathan McDowell*[1], *Belinda Wilkes*[1]
1. Harvard-Smithsonian Center for Astrophysics
2. EXOSAT Observatory, ESTEC

EXOSAT and *Einstein* studies of PG1211+143 show that its extraordinarily steep low energy spectrum is a persistent feature over at least 7 years. The strength of the steep spectrum nevertheless changes by factors of 2–3 on relatively short timescales. Two low energy (~0.15 keV) variations, from CMA 3LX filter data, are particularly interesting: a factor 3 decrease in 190 days, and the shortest variation of a factor of 2.3 increase in 19 days. The higher energy (2–10 keV) ME data vary by a smaller factor than the LE/CMA count rates, suggesting that the emission in the bands is linked but only weakly.

Such rapid variability rules out an extended source for the soft x-ray spectrum and also an optically thin plasma as the source of the emission. The most obvious remaining candidates are associated with the inner regions of an accretion flow, in particular a disk.

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