9.16
VLA Observations of Solar Radio Bursts
R.F. Willson, K.R. Lang
(Tufts University)
Very Large Array (VLA) snapshot maps at intervals as short as 3 seconds indicate that explosive radio bursts originate at the apex of coronal loops (at 20 cm), and that the bursts may be triggered by preburst heating within coronal loops or magnetic interaction between the loops. Type I radio bursts, that occur during solar noise storms, originate near the apex of large-scale magnetic loops (90 cm) that connect active regions with more distant regions on the solar surface. Successive Type I bursts can originate in the same source. Successive components of other 90 cm bursts originate in the widely separated legs of magnetic loops.

9.17
An Intensified CCD EUV Camera for the SOHO/CDS Experiment
L. Golub and K. Kalata (SAO), and A.I. Poland and R.J. Thomas (GSFC)
We describe the EUV array camera which is being built for flight on the SOHO Coronal Diagnostic Spectrometer (CDS) experiment. The camera records images of spectra in two wavelength bands near 350Å and 600Å; the spectra are stigmatic, so that spatial resolution is preserved along the slit while spectral resolution is maintained in the direction of dispersion. The scientific requirements which led to the choice of an intensified CCD system are: the need for large dynamic range (1000:1) in order to record data in both strong and weak spectral lines, high resolution (10 microns) in the focal plane in order to retain the good spectral and spatial resolution of the optical design and the ability to handle the high count rates (up to 3000 counts/pixel/second) which are encountered in Solar viewing. Both laboratory and rocketborne versions of this detector have been built and their performance meets or exceeds expectations in terms of EUV sensitivity, resolution, dynamic range, linearity, uniformity, and noise levels. For the SOHO/CDS version the detector will simultaneously record the spectral bands 314-386Å (with 36Å pixels) and 520-640Å (with 60Å pixels). These bands were chosen to cover important emission lines which provide diagnostics throughout the Solar transition region and inner corona. In the spatial direction the pixel size corresponds to 1 arcsecond, giving an instantaneous field of view of 4 arcmin. Such observations are ideally suited to studies of coronal heating, solar wind acceleration and the transport of mass, momentum and energy.

Session 10: Cosmology
10:00–11:30 am, Salon E
10.01
Determination of the Absolute Flux of the Cosmic X-ray Background in the 1.3 keV Band
T.T. Hamilton, D.J. Helfand, X-Y. Wu, and Q. Wang
(Columbia University)
Using a variety of data collected by the Einstein Observatory imaging proportional counter, we have determined to an accuracy of ±10% the absolute flux of the diffuse X-ray background in the 1.3 keV band. A variety of instrumental signatures in the data were removed by careful editing, and the solar scattered flux was eliminated by using satellite nighttime data only in the analysis. We then calculated the fraction of the detected counts caused by cosmic ray particles via two independent methods, obtaining an accuracy of ±5%. Limits on the contribution of galactic emission in this band were set by examining the galactic longitude dependence of the observed emission at high galactic latitudes. We conclude that the total diffuse background observed at Earth in this band is ~40% higher than the extrapolation of the spectrum observed at higher energies, but that at least one third of this excess is galactic emission. Our resulting limit on the truly cosmic diffuse flux in this band severely constrains recent models for the spectra of active galaxies designed to match the spectrum of the background at higher energies.

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10.02 (Dissertation)
Simulation of large scale structures in $\Lambda \neq 0$
Friedmann cosmological models
H. Martel (Cornell University)
We study the formation and evolution of large scale structures in the Universe using a two-component Friedmann model composed of non-relativistic, pressureless matter and a nonzero cosmological constant $\Lambda$. The calculations we made follow the evolution of density and velocity perturbations from the recombination epoch (taken to be at a redshift of 1000) until the current epoch. Our parameter survey includes inflationary, $k = 0$ models, non-inflationary models, and for comparison purposes, $\Lambda = 0$ models. We compare models with current age equal to $H_0$ and $2H_0$, where $H_0$ is the Hubble constant, and with density parameter $\Omega_0$ ranging from 0.02 to 2.
For these models, we present (1) the relationship between current density contrast and density perturbations at recombination, (2) structures of the models in radius-velocity phase space, and (3) statistical analysis of the velocity distributions. We emphasize comparisons between $\Lambda = 0$ models and $\Lambda = 0$ models, and between $\Omega_0 = 1$, inflationary models and $\Omega_0 = 0$, non-inflationary models (where $\Lambda_0 = \sqrt{\Omega_0}/H_0$).

10.03
Dark Matter Clumping: Background Galaxies Lensed by Galaxy Clusters
J.A. Tyson (AT&T Bell Laboratories)
Evidence for statistical gravitational lensing is mounting, with the recent discovery of many "arc" (gravitationally distorted background galaxy images) in compact rich galaxy clusters. Lensed QSOs and bright arcs from caustics (as in A370) may be just the brightest examples of gravitational lensing. In the last year many cases of faint background galaxies lensed by foreground galaxies have been discovered. At faint limiting surface brightness (29 B mag/sq. arcsec) the sky is over 15% covered with high surface density of faint blue galaxies; there are over 150,000 galaxies per square degree brighter than 27 magnitude. Several lines of evidence suggest that these galaxies are at redshifts between 1 and 3. This distribution of distant galaxies is uniform over the sky to better than 10%. Foreground clumped mass will thus have a predictable statistical effect on the correlation of shapes of these background galaxies. Compared with QSO lenses, the probability of galaxy-galaxy lensing is high. Automated detection of this kind of statistical lensing has been used to set limits to the dark halo of average foreground galaxies.