50.07
Substructure in a X-ray Flux-Limited Catalog of Abell Clusters of Galaxies
D. S. Davis (U of Maryland, NASA/GSFC) and Richard Mushotzky (NASA/GSFC)

We are currently investigating the possibility that clusters of galaxies may not be evolved objects which are dynamically relaxed but may be currently forming via mergers of groups and poor clusters. Optical studies of clusters have not provided convincing evidence of a clumpy galaxy distribution in clusters, which would support the merger hypothesis. However, much of the controversy about the reality of substructure in clusters can be traced to the use of galaxies as test particles in the optical studies. In many cases the number of galaxies identified in the suspected substructure is too few to eliminate statistical uncertainty in the identification. We are searching for substructure in clusters of galaxies using X-ray images of clusters, because the sensitivity of the X-ray gas to small variations of the potential makes these observations a powerful tool to search for substructure which avoids many of the problems with an optical search. Once we have identified structure in the X-ray images we will do follow up work in the optical to confirm the structure. The combined X-ray and optical information will allow us to determine the size and mass of the objects merging with the clusters. Once we have determined the fraction of our sample with substructure we can then compare our observations with current theory and numerical models of cluster formation.

50.08
Consolation of a Disappointing Search for Failure: Discovery of a Giant Luminous ARC
W. Tucker, D. Fabricant (CfA), A. Dressler (CfA)

Do failed clusters of galaxies, i.e., large gas clouds where few if any galaxies have formed, exist? In an effort to answer this question, we have undertaken a program to search the Einstein Observatory IPC (Imaging Proportional Counter) data archives for extended high latitude sources which have no associated visible galaxies. As yet we have no strong candidates for failed clusters, but we have found some interesting objects. Among these is a luminous high redshift (z=0.4) cluster in the constellation of Pictor. It contains a giant luminous arc 15" long, which is presumably due to gravitational lensing by the cluster of a distant background galaxy.

Session 51: Solar Magnetic Field
Display Session
Regency South

51.01
Atlas of Stackplots Derived from Solar Synoptic Charts
P. S. McIntosh, (NOAA/SEL), E.C. Willock, R. J. Thompson (IPS)

Long-lived patterns of solar magnetic-field polarity and coronal holes are revealed in a collection of stackplots, time series of narrow zones of solar latitude. The plots, based upon a 21 year collection of H-alpha synoptic charts compiled at the Space Environment Lab of the National Oceanic and Atmospheric Administration in Boulder, Colorado, portray the long-term, large-scale evolution of solar magnetic features for the time interval September, 1966 through December, 1987 (Carrington Rotations 1512-1756). These data record two complete sunspot cycles (most of Cycles 20 and 21, and the start of Cycle 22). Coronal hole data are available from the x-ray images obtained for 1975-1987.

Applications for these data include: studies of variable rates of solar rotation of magnetic field and coronal hole patterns, inference of the general circulation of the solar atmosphere, definition of the solar cycle from large-scale parameters, independent of sunspots; improved studies of the reversal of polar magnetic fields, and meridional motions of large-scale features.

51.02
Doppler and Magnetic Studies of the Flare-Producing Area of NOAA 6659
S.R. Walton, G.A. Chapman, R.S. David (SFO/CSUN)

The San Fernando Observatory Video Spectra-Spectroheliograph (VS2HG) produces simultaneous spectra-spectroheliograms in two orthogonal polarizations during four successive scans, all four Stokes vectors are recorded over a spectral region approximately 1.5 A wide, with pixels of 8 mA in the spectral direction and 0.46 seconds of arc in the spatial direction. Since each individual scan produces a continuum, line core, and Doppler map, these are both simultaneous and co-spatial, essentially by definition. The continuum images from each scan are used to align the separate scans of Stokes Q, U, and V. From these aligned scans, maps of the vector magnetic field are produced. A brief description of the VS2HG can be found in Lawrence, Chapman, and Walton (1991), Ap. J. 375, 771; a detailed description of the data processing procedure is in preparation. We observed active region NOAA 6659 using the VS2HG on 7 June and 10 through 15 June 1991, a period from two days before to six days after its central meridian passage. The Doppler maps from the 7th and the 10th show a blueshifted area just to the west of the northernmost sunspot of the group. This area was especially prominent on the 10th, and was co-spatial with the west ribbons as seen in Hα of an M3.2 flare which occurred at 1654 UT. (This region produced a very large flare (X21.0) at 11 June 0229 UT, but as of this writing, we don’t have the precise location of this flare.) The vector maps show a strong tangential component of the magnetic field in this area. The direction of the tangential field changes rapidly across the area of the blueshift. The later observations (12 and 13 June) show what, given the disk position, appears to be an area of downflow in the same area: i.e., a redshift on the disk center side and a blueshift on the limbward side. We will show and discuss further the maps at the meeting. This research has been partially supported by NASA grant NAGW-2453 and NSF grant ATM-9115111.

51.03
SPAM: A Canned Internet-Accessible Database of Interest to Solar Flare Researchers
R. C. Canfield, H. S. Hudson, E. Kierra, R. M. Metcalf, J.-P. Welser (UH/CfA)

We have established a searchable database, called SPAM (Spectroscopy and Polarimetry at Mees), which contains logs of observations made at Mees Solar Observatory (Haleakula, Maui). Of more general interest, the database also includes the Events List and Region Report from the Space Environment Laboratory (Boulder). Logs from YOHKO are currently being added. Hence, SPAM can be used to determine, for example, whether Mees has vector magnetograms of a certain NOAA AR or whether YOHKO has certain types of observations in specified time ranges. As well, it can be used to search the SEL database for flares with selected attributes. Included logs (and searchable attributes, in addition to date, day of year, and time) are: Mees Solar Observatory Log, instrument, NOAA AR, data type, observing setup, SEL Event List (NOAA AR, X-ray Class), SEL Region Report (NOAA AR), YOHKO Orbit Summary, YOHKO SXT Quiet Mode FF Observations (latitude, longitude, X-ray and optical image size), YOHKO Flare Observations (latitude, longitude, specific channel counts or ratios). SPAM runs on a Sun workstation at Mees Solar Observatory, and is available over Internet. Simply access (e.g., telnet) koa.ifs.hawaii.edu (128.171.167.1) from any vt100, Sun, or xterm emulator. Log on as spam (lower case); there is no password. New users are asked to read release notes and hints.