14.01
Dark Gaps in Emission Corona Images
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Fe XIV (5303Å) and Fe X (6374Å) coronal images occasionally show regions of extremely low emission, often in the form of a narrow radial gap that appears anomalously dark relative to the immediately adjacent parts of the corona. Such gaps have been described previously in the literature and attributed to either a localized non–optimum temperature for the emission or reduced coronal plasma in the region, both circumstances presumably associated with some exceptional magnetic field configuration. However, loops are sometimes observed spanning gaps, with diminished loop brightness over the region of the gaps. We therefore postulate that at least some gaps are caused by absorption of coronal emission. We discuss the morphological details of particular cases and explore the plausibility of two absorption mechanisms contributing to the phenomenon.

14.02
VLA Observations of Radio Filaments
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(Astr. Prgm, Univ. Md)

We report on an investigation of radio filaments using 20 cm VLA observations obtained during the International solar Month. The radio filaments, when compared with the H- filaments, showed very good agreement. The total brightness temperature above the filaments ranges from a few times 10^5 K to the quiet Sun level (~ 10^5 K). We present a simple model which incorporates the brightness contributions from the filament, the prominence – corona transition region, the filament cavity and the coronal streamer and the normal corona. The coronal cavity seems to be mainly responsible for the observed depression in brightness temperature. We compare our results with previous observations of the radio filaments.

14.03
Global Streamer Evolution
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(Astr. Prgm, Univ. Md)

We have compared SMM-HAO white light coronagraph and Mauna Loa Mark III coronometer images of a streamer with two-dimensional maps of the Sun's radio corona made with the Clark Lake Multi-frequency Radiotelescope at 30.9, 50 and 73.8 MHz. The streamer showed evolution in the course of a day in both the radio and optical data, and we present an analysis of this evolution.

14.04
On the Polarization of Microwave Emission from Active Regions: Results from CoSMIOC
G.D. Holman (NASA/GSFC), J.W. Brosius (STX), J.T. Schmelz (ARC), and R.F. Wilson (Tufts U.)

Two of the five active regions observed during the Coronal Magnetic Structures Observing Campaign (CoSMIOC) were within 40º of solar disk center. The microwave polarization of both, relative to the direction of the longitudinal photospheric magnetic field, is consistent with theoretical expectations for an optically thin plasma (i.e., extraordinary mode). Simultaneous SMM-XRP soft X-ray observations show the presence of ~ 2 - 3 x 10^5 K plasma that is too optically thick to account for the observed polarization and brightness temperatures at 20 cm, however. We find that a cooler plasma must be present above the X-ray emitting plasma to explain the observed 20-cm brightness temperatures, as has been found elsewhere, and that the radiation is in fact emitted predominantly in the ordinary mode. The observed polarization is obtained after the emitted radiation traverses a region where the line-of-sight magnetic field component reverses direction. Potential field extrapolations of the photospheric magnetograms show that the required field reversal is indeed present. Emission observed at 6 cm from one of the active regions indicates that mode coupling occurs at this frequency. The implications for the active region plasma and magnetic field properties will be discussed.

14.05
CoSMIOC III: Measuring Magnetic Fields in Active Region Corona Plasmas
J.T. Schmelz (ARC/Lockheed), G.D. Holman (NASA/GSFC), J.W. Brosius (STX), and R.F. Wilson (Tufts U.)

Simultaneous soft X-ray, microwave, and photospheric magnetic field observations were taken of an active region near the solar limb during the Coronal Magnetic Structures Observing Campaign (CoSMIOC). The plasma electron temperature and emission measure determined from the Solar Maximum Mission X-Ray Polychromator data were used to predict the structure and strength of the thermal bremsstrahlung emission at cm wavelengths. The observed 20 cm structure is similar to that expected from the X-rays but the predicted strength is too high; this result requires cool material (T_e = 10^6 K) between the hot X-ray plasma and the observer. This overlaying cool plasma is shown to be third harmonic gyroresonance emission. Very Large Array maps of the emission, made at several frequencies in the 20 cm band, peak at slightly different spatial locations; the lower frequency maps peak closer to the solar limb (higher in the atmosphere). Since \nu \propto B for gyroresonance emission of a given harmonic, these maps are depicting plasma at slightly different heights in the atmosphere, each layer with a lower temperature and magnetic field value as height increases. The field values and gradients will be compared with those obtained from extrapolations of the photospheric field into the corona and a model of the active region will be presented.

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