applying the shear at the photospheric level. There is no evidence of either field-line slippage or the build-up of a resistive boundary layer at the temperature maximum. Additional studies include shearing the arcade up to some level prior to eruption, removing the shear, and allowing the arcade to come to an equilibrium. Short-time scale disturbances of this sheared arcade do not induce any instability, and the arcade simply returns to the unperturbed sheared state. This behavior is consistent with the interpretation that the eruption occurs as a result of a loss of equilibrium rather than an instability. Research supported by NSF and NASA.

15.16
Collisional Damping of Magnetoacoustic Waves in the Solar Corona

Lisa J. Porter, Peter A. Sturrock, James A. Klimchuk (Stanford U.)

A general dispersion relation for waves in a homogeneous background plasma has been derived. Both ion viscosity and electron thermal conduction were included consistently in the derivation, and no assumptions were made about the size of the damping. The dispersion relation was solved for various densities, temperatures, and magnetic field strengths relevant to the solar corona, and the effects of these parameters on the wave damping rates were thus quantitatively determined. It was found that, for active region conditions, fast mode waves damp at a sufficient rate to balance radiative losses if the wave periods are less than about one second. For quiet Sun conditions, fast mode waves with periods as large as 40 seconds are able to damp at rates large enough to match the radiative losses. The damping of slow mode waves, on the other hand, was quite large for all of the cases studied. In active regions, slow mode waves with periods less than 100 seconds were able to balance radiative losses, while in quiet regions, slow mode waves with periods as great as 300 seconds provided sufficient damping.

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15.17
The Initiation of Coronal Mass Ejections

J. Feynman (JPL), S. F. Martin (Caltech)

We will present evidence that the eruption of filaments and coronal mass ejections (CMEs) occur as a consequence of the destabilization of large-scale coronal arcades due to reconnection between these structures and new and growing active regions.

Many scenarios have been developed concerning the initiation of Coronal Mass Ejections (CMEs). However, for the most part, these scenarios have not been strongly supported by observations. Recently a scenario in which CMEs are initiated by the eruption of new magnetic flux beneath the pre-existing closed coronal structures has been modeled by Steinolfson, who has found that many of the observed characteristics of CMEs were seen in the model calculations.

We have observationally tested the hypothesis that the eruption of quiescent filaments and associated CMEs are initiated by magnetic reconnection between the pre-CME largescale coronal structures and new, growing active regions. Both statistical studies and case studies were carried out. We have found that 2/3 of the filament-associated CMEs occurred after substantial amounts of new magnetic flux emerged in the vicinity of the filament. The emergence of the new flux in the form of new active regions begins a few days before the eruption and typically is still occurring at the time of the eruption. In all cases in which the new flux was oriented favorably for reconnection with the pre-existing coronal arcades; the filament was observed to erupt.

We will describe some case studies and present our statistical results.

15.18
Thermal and Density Structure of Polar Volumes II: Analysis of the Transition to the Solar Wind, using EUV and Visible Light Observations

C.E. DeForest, A.B.C. Walker, Jr. (CSSA, Stanford University), D. Sime (NCAR/HAO), R.B. Hoover (NASA/MSFC), and T.W. Barbee, Jr., (LLNL)

Normal incidence multilayer coated EUV/XUV optical systems provide a powerful technique for the study of the structure of the inner solar corona. Such systems permit high-angular resolution imaging of the full solar disk and inner corona to a radius of ~1.5 solar radii, in narrow wavelength bands that are dominated by a single line or line multiplet excited over a well defined range of temperatures. The capabilities of these telescopes complement those of conventional optical coronagraphs, which typically observe coronal structure from a radius of 1.5 solar radii, out to several solar radii. Previously, we have photometrically analysed and derived temperature and density information from images of polar plumes obtained with a multilayer Cassegrain telescope operating in the wavelength interval λ = 171 Å to 175 Å, and fitted a simple model of coronal expansion to the data. Here, we report on the combination of optical data from the HAO K Coronagraph, which provides photometric information from the outlying corona, with XUV data from the same multilayer Cassegrain telescope.

15.19
A Global Coronal Hole and Streamer Model


Up to the present, coronal streamers have been successfully simulated using numerical solutions to the time-dependent equations for polytropic, magnetohydrodynamic flow. However, these solutions can only give the approximate physical properties for coronal holes or streamers which do not describe both physical properties at the same time. In this presentation, we shall give a two-dimensional solution which could describe the approximate physical properties for these typical values of coronal holes and streamers simultaneously. The motivation for this study is to develop a tool for the interpretation of the observations to be obtained from UVCS and LASCO experiments on board the upcoming SOHO mission. In addition, we also will present some model calculations for a three-dimensional case.

15.20
Coronal Flux-Tube Expansion and the Solar Wind Speed at Ulysses

N.R. Sheeley, Jr., Y.-M. Wang (NRL), S.J. Bame, J.L. Phillips (LANL), B.E. Goldstein (JPL)

Using a current-free model, we derive flux-tube coronal expansion factors from photospheric observations and compare them with wind speeds at the Ulysses spacecraft during its voyage from Earth to Jupiter and subsequently 26 degrees into the southern hemisphere. Magnetic field