network is bright. Furthermore, active region plage rapidly turns bright toward the limb; the network also brightens but more slowly. We have constructed a simple model that assumes that the magnetic lines-of-force are approximately vertical in active region plage, while those in the quiet sun network are inclined at the photosphere. This model correctly predicts the continuum contrast of network at disk center, and also its variation from center-to-limb. This provides evidence that the network is often inclined from vertical by 30 degrees or more.

This work was supported by Lockheed IR Funds, by NASA contracts NAS8-32805 (SOP), NAS8-26813 (OSL), NAS5-30386 (MDI), and NAS8-38106 (BSOUP), and NSF contract ATM-8912841.

48.04

Diffusion of “Corks” Over the Solar Surface

A.M. Title (LPARL), G.W. Simon (Phillips Labs), N.O. Weiss (Cambridge Univ.)

Test particles in flow fields generated by correlation tracking of movies of the solar surface and kinematic models of the solar surface quickly collect in stagnation points of the flow fields and remain there. Test particles do not form a quasi-stable network pattern. The diffusion coefficients generated from a set of kinematic models with a range of cell sizes and lifetimes are not proportional to the cell size squared divided by the cell lifetime as commonly assumed. Reasonable estimates of cell sizes and lifetimes yield diffusion coefficients that are lower than the 600 km/s used by Sheeley and his collaborators in their surface diffusion models. We conclude that: 1) The appearance of plages and enhanced network cannot be explained by adjustment of the cell sizes or surface velocities; and 2) diffusion is not sufficient to explain the appearance of plages and enhanced network.

48.05

Solar Coronal Magnetic Field Topology Inferred from High Resolution Optical and X-ray Movies

T. Tarbell, Z. Frank, N. Hurlburt, M. Morrison, R. Shine, and A. Title (Lockheed PARL), L. Acton (Montana State Univ.)

We are using high resolution digital movies of solar active regions in optical and X-ray wavelengths to study solar flares and other transients. The optical movies were collected at the Swedish Solar Observatory on La Palma using the Lockheed tunable filtergraph system, in May - July, 1992. They include longitudinal and transverse magnetograms, H-alpha Doppler and intensity images at many wavelengths, Ca K, Na D, and white light images. Simultaneous X-ray images from Yohkoh are available much of the time. We are learning several ways to establish the connectivity of some coronal magnetic field lines. Some of the clues available are: magnetic footprint polarities and transverse field directions; H-alpha fritzius and loops seen in several wavelengths; proper motion and Doppler shifts of blobs moving along field lines; footpoint brightening in micro-flares; spreading of flare ribbons during gradual phases of flares; X-ray morphology and correlations with H-alpha; and draining of flare loops. Examples of each of these will be shown on video.

This work is supported by NASA Contracts NASW-4612 and NAS8-37334 and by Lockheed Independent Research Funds.

48.06

Emergence of Twisted Flux Tubes in the Solar Atmosphere

R. Matsumoto, T. Tajima (UT Austin), K. Shibata (NAOJ)

Solar coronal loops observed in soft X-rays often show twisted structures. Sometimes, magnetic loops unwind after the topological change of magnetic field lines (McAllister et al. 1992). Since twisted flux tubes have more free energy than untwisted loop, when they emerge into the corona and interact with other loop or overlying magnetic fields, the release of magnetic energy will lead to energetic events such as flares, jets, and prominence eruptions.

We performed three-dimensional nonlinear MHD simulation of the evolution of twisted flux tubes. The initial state consists of hydrostatic atmosphere with a cold dense layer and a hot corona. In the cold layer, magnetic fields are concentrated in the horizontal flux tube. Fluid rotation at both ends of the flux tube is continuously applied. Such twisting motion generates torsional Alfven waves which propagate along the flux tube. After several rotations, the flux tube becomes kink unstable at the midpoint where the magnetic twists are accumulated. The flux tube is deformed into a super-coil structure. Later, twisted magnetic loops rise by the magnetic force and the buoyancy force created by sliding the gas along the flux tube. The length of each rising loop is about 10H in the cold layer, where H is the scale height. We will further study the subsequent evolution of twisted flux tubes in the corona, and their interaction with overlying magnetic fields.

48.07

A Comparison of the Disappearing Ionospheres with Solar Minimum Ionospheres on Venus from Pioneer Venus Orbiter Measurements

J. Kar, J.M. Grebowsky, R.E. Hartle (NASA/GSFC), P.A. Cloutier (Rice U)

Despite the slow rotation of Venus, the nightside ionosphere is generally quite robust (10^5 - 10^7 cm^-3) at solar maximum except during very high solar wind dynamic pressure conditions. During the solar minimum conditions, the ionosphere is very depleted (disappearing ionospheres, DI) and these states are expected to be analogous to the typical solar minimum conditions on the nightside of Venus. The last in-situ ionospheric data from the Pioneer Venus Orbiter were obtained recently (July-October, 1992) during its entry phase when the solar activity was approaching a minimum level. The Orbiter ion mass spectrometer measurements will be used to compare the relative ion abundances during DI's and the decreased solar activity level. Incidence of superthermal ions during these two regimes will also be compared.

J. Kar acknowledges support by the National Research Council.

48.08

The Statistics of the CD-ROM Digital Archive of the International Halley Watch

D.A. Klingselssmith III (NASA/GSFC), E. Grayecek (UoMD/PDS-SBN), M.B. Niedner (NASA/GSFC)

The digital Archive of the IHW is a collection of 35 CD-ROMs containing the totality of data submitted by over 1500 observers of Comet Halley during its most recent apparition. The remote (ground-based) data was collected into nine disciplines of astronomical observations: Astrometry, Infrared Studies, Large-Scale Phenomena, Near Nucleus Studies, Photometry, Radio Studies, Amateur Observations, Meteor Studies, and Spectroscopy. The space data is being assembled separately on the last two disk of the series (HAL-0025 and HAL-0026).

This poster will present statistics about the distribution of observations made, when they were made, and where they were made. The basic software tools for using the CD-ROMs, which have been included on the disks, will be described. Besides the actual observations, a large amount of documentation detailing the data collection and data archiving are included on the CD-ROMs. In order to facilitate searching through the 15 Giga bytes of data a number of general and discipline specific index tables have been provided.

The time period covered was from December 1981 through April of 1989. There were over 60,000 individual observations recorded in 23 subsets.

The CD-ROMs are being distributed to all of the contributors who asked for them and to major astronomical facilities around the world. Additional copies can be obtained through the NASA Planetary Data Systems Small Bodies Node at the University of Maryland (pdf@astro.umd.edu) and/or NASA National Space Sciences Data Center (request@ssdc.gsfc.nasa.gov)