ABSTRACTS

14.02 Solar Speckle Imaging with a CCD Camera. P. NISENSON, CFA, R. STACAR, CFA, R. NOYES, CFA, and S. EBSTEIN. HARVARD U. In a recent series of experiments, we have demonstrated the extraction of high spatial resolution images from atmospherically degraded broadband solar speckle data. Detail as fine as 0.11 arcsecond has been observed, though seeing in the input frame was worse than 2 arcseconds. The data sets were recorded with two different cameras: one based on a General Electric CID chip, and the other based on an RCA CCD. These cameras have the linearity and wide dynamic range required to record the extremely low contrast intensity modulation which occurs in solar speckle. In this paper, we will show image reconstructions from our solar data, as well as results from a series of laboratory experiments which demonstrate the capabilities and limitations of the process. These experiments are of particular importance since they provide an accurate measure of the fidelity of our reconstructions from telescope data.

14.03 The Coordinated Instrument Package for the Solar Optical Telescope. C. J. Wolson, T. D. Tohill, K. P. Topka, A. M. Title, Lockheed Palo Alto Research Laboratory. The Coordinated Instrument Package (CIP) is the only science instrument that will be on the initial flight of NASA’s Solar Optical Telescope, shuttle launch scheduled for late 1989. It will consist of the instrumentation required to perform the experimental observations for both the Coordinated Filtergraph Spectograph (CFS) and the Photometric Filtergraph Instrument (PFI) investigations. The CFS contains a narrowband, visible, tunable filtergraph, a visible and ultraviolet spectograph, and an imaging processing system. The cameras for both systems use large CCD arrays. The PFI contains a pair of film cameras behind broad bandpass continuum filters. The CIP has an active image motion stabilization system to enable diffraction-limited performance and a dedicated experiment processor for experiment control and data flow management. The conceptual design, instrumental parameters, and preliminary observing plans will be presented. The CIP program at LPARL is supported by NASA contract NAS5-26813.

14.04 Calibration of the Videomagnetograph at Big Bear Solar Observatory. A. P. PATTERSON, Big Bear Solar Observatory and Caltech. At Big Bear Solar Observatory we have initiated a procedure for calibrating our videomagnetograms by using solar rotation. This paper presents the method of calibration and the problems encountered in its use. Magnetic field measurements from the videomagnetograph are compared with spectrographic magnetic field measurements. The reliability of the calibration method is discussed.

14.05 A Multiple Diode Array (MDA). A. L. WIDENER and R. B. DUNN, Sacramento Peak Observatory; G. E. SPENCE, AFG/PHS - The Sacramento Peak Observatory Multiple Diode Array (MDA) controls up to eight RCA CCD arrays (320 x 512 pixels). A two-bit deep memory in the MDA allows discarding uninteresting individual pixels or adding together adjacent pixels so that the data rate to the host computer can be substantially reduced. The interference fringes in the "thin" array have been studied as a function of wavelength.

14.06 Sunspot Cycle 21: Second Largest on Record HELEN E. COFFEE, JOHN A. MCKINNON and DANIEL C. WELKINSON, NOAA. The current solar activity cycle, sunspot cycle 21, is the second largest one recorded. We present graphical and tabular measures of solar activity that include the sunspot number, the 10.7cm solar radio flux, and the geomagnetic aa index. Comparisons are made with earlier sunspot cycles. All observations presented are available from the Monthly Publication Solar-Geophysical Data and from the archives of World Data Center A for Solar-Terrestrial Physics.

14.07 The Mini-Sunspot Cycle of 1982. ROCK, K., FISHER, R., MCCABE, H., MICKEY, D., and SIMON, D., "NOAA/NCAR, and IFA U. of H. - During the summer of 1982, the rotational modulation of the sunspot number equaled the amplitude of the variation observed typically over an entire sunspot cycle. This was the result of an unusual concentration of solar activity found on one hemisphere, while the other hemisphere was almost devoid of spot groups. An intense observing effort by both the Mees Solar Observatory on Haleakula and the Mauna Loa Solar Observatory on Mauna Loa was under progress at this particular time and yielded a very comprehensive set of photospheric, chromospheric and coronal data. This set of observations has been used to relate to Ca II K-line daily, projected plage area to the estimated daily, integrated value of polarized brightness of the solar corona. For the period of observation it is possible to find a linear correlation (r = 0.78) between the total integrated Ca II plage area, $\Delta g$ and the estimated mass of the white-light corona for the exposed hemisphere.

$$M_{\text{corona}} = 2.88 \times 10^{15} (1.71 \times 10^{5} K_1 - 1.13 \times 10^{3})$$ g,

where $K_1$ is the equivalent width of a one angstrom wide bandpass centered on the K-line, estimated by the relationship.