ABSTRACTS

04.P.03 Pseudo-Resolution of Solar Magnetic Flux Tubes in Faculae. T. D. Tarbell, Lockheed Solar Observatory. I have continued to analyze spectroheliograms of active region plage at disk center obtained at KNO. After digitizing, these provide 2-dimensional grids of Fe I 5250 line profiles in orthogonal circular polarizations with 1.5 arcsec spatial resolution. A magnetogram is constructed, and low-noise average profiles are derived as a function of magnetograph signal Sb, outside sunspots. Up to 250 G, these profiles are linear in log Sb, indicating that Sb measures the fraction of the resolution element covered with field. An extrapolation technique has been developed to derive the intrinsic magnetic profile in spite of the poor spatial resolution. This method properly allows for line weakening and continuum brightening in the flux tubes, and it has yielded nearly identical facular profiles from plage of both polarities in several active regions. These intrinsic profiles can be used to calibrate Babcock magnetographs. Among the conclusions are: (a) Zeeman widths of 1300-2000 G are present; (b) log Sb decreases by a factor of 1.6 at 0.2 arcsec; (c) downdraft velocities are 0.6 - 0.9 km/sec; (d) the absorption in the red wing has a broader, shallower profile than in the blue. This last fact shows that spatial gradients of field strength and downdraft velocity are present in individual flux tubes, with larger B and V occurring together.

05.P.05 Analysis of Balmer Line Profiles in Young Stars with Stellar Winds. S.A. Drake and R.K. Ulrich, UCLA, O.H. Knapp, Owens Valley Radio Astronomy. Observations of Balmer line profiles have been obtained at Mt. Wilson and Palomar with the Varo-Newton Scanner described by Schectman and Hiltner (1976, P.A.S.P., 88, 960) of a variety of young pre-main sequence emission-line stars. Several of these objects including Z CMa, FU Ori, the Cohen-Kuh-Bhariani Object and HD 45 3471 have line profiles which seem unambiguously to indicate the presence of outflow or a "stellar wind" in the outer layers. To derive information about the exact nature of the velocity law, the physical conditions of the outflowing gas and the mass loss rate, the observed Balmer profiles have been compared with theoretical ones. The theory uses a Sobolev approach modified by the inclusion of non-local radiation in the source function in decelerating outflows in the way discussed by, amongst others, Rickett and Turner (1971, Ap.J., 51, 654). The results are compared with those of Kuan and Kuhn (1972, Ap.J., 199, 148) who similarly modeled P Cygni stars but with an unmodified Sobolev treatment; in particular, their conclusions on Z CMa are contrasted with those reached in this study.

06.P.03 Solar Spectrum Synthesis. R.L. Kurucz, CFA - We present examples of the use of our spectrum synthesis computer programs in analyzing the solar spectrum. Given a model atmosphere, LTE or non-LTE, we compute a theoretical spectrum including 500,000 atomic and molecular lines. Lines from atoms that are treated in non-LTE in the model are treated in non-LTE in the spectrum calculation. Strong lines can be treated with partial redistribution. Once an intensity or flux spectrum is calculated, it can be rotationally, macroturbulently, and instrumentally broadened, then plotted together with an observed spectrum. The lines are automatically labeled, Harvard, NRL, and Hawaii rocket spectra and Skylab and OAO-8 data in the UV, Kitt Peak visible and infrared atlases, and the SSO Peak irradiance atlas are in use.

07.P.14 A Preview of the Atlas of Nearby Galaxies. B. Brent Tully, Institute for Astronomy, Hawaii and J. Richard Fisher, National Radio Astronomy Observatory. A rough draft of a number of maps from a forthcoming atlas of nearby galaxies will be presented. Systemic radial velocities are color coded and types and sizes are symbol coded. Galactic coordinates are used in the maps.

08.P.10 Formation of black holes in the early universe. BLACKENHURST, G.V., and HENRIQUES, H.R., Queen's University at Kingston, Ont. - The evolution of spherically symmetric inhomogeneities in the early universe is studied numerically by the method of characteristics, in particular those inhomogeneities which collapse to black holes. We deal with two types of perturbation, (a) those which have exactly the same mass as the corresponding homogeneous region, (b) inhomogeneities with a mass excess. We find that type (a) perturbations with $\mathcal{E}/c^2 \ll 1$ ($\mathcal{E}$ = energy density) and a sufficiently large scale, collapse to black holes of approximately horizon mass; whereas type (b) perturbations of similar