twice better than the Arcturus atlas (1.7 A/mm), three times better than the Utrecht solar atlas (0.3 A/mm), and five times better than a ruled grating in the same spectrograph (3.2 A/mm). Thus holographic gratings enable recording of extensive spectral regions with a quality that otherwise would require double-pass spectrometers or interferometers. A price to be paid, however, is an efficiency of only 40% or less, which is worse than for a blazed ruled grating.

11.02.05 Comparison of Molecular Equilibrium Calculations for Stellar Atmospheres, S. Ames, W. Fullerton and W. T. Huebner, Los Alamos Scientific Laboratory, Los Alamos, NM. - Results from various independent molecular abundance computer programs are compared with our own. We find that depletion of some species such as SiO, CN, and PO in different calculations can significantly alter their results. Also, important ion-atom species such as H$_2$O, CH$_4$, OH, HO$^+$, SiIII, AlIII, CN$^+$, CO$^+$, N$_2^+$, and NO$^+$ have not been considered by several authors. Transport of these ions to less dense regions could destroy chemical equilibrium such as soon as we used in some model calculations. This effect must be investigated further. It has been stated recently that condensation will affect abundances of molecular abundance in the gaseous phase at low temperatures. We demonstrate this effect with an internally consistent calculation on a mixture containing 20 elements and over 100 molecules. Specifically, SiS, which would be relatively abundant above its condensation temperature, practically disappears out of the gaseous phase because SiO condenses into refractory solids below about 2500 K. Similar results are obtained for other molecules containing elements like Al and Ti that form refractory compounds.

11.03.05 A Comparison of Line Transfer Methods in Moving Atmospheres, L. R. Doberty, E. H. H., and C. L. Olson, U. Wis. - The approximation developed by Castor (1970 M.N.R., 149, 111) for the escape probability of photons formed in a radially expanding atmosphere has served as the basis for a number of recent calculations of emission line profiles in hot stars. This approximation is most effective in the limit of large velocity and low optical thickness. However, little is known about its accuracy in situations where relatively low expansion speeds and moderate optical depths prevail. The validity of the approximation may also depend on the form of v(r). We have solved the equations of statistical equilibrium for several models of expanding hydrogen envelopes using both Castor's approximation and a full treatment of line transfer based on a linearized form of the integral equation of transfer. The flow accelerates according to the velocity law of Kuan and Kuhl (1975 Ap. J., 199, 148). All models have the same asymptotic velocity of five times thermal, with different values of the mass loss up to 10$^{-5}$ M$_\odot$/yr. The radius of the stellar core is 15 R$_\odot$, and T = 30000 K.

11.04.03 Velocity Effects in the Profiles of Self-Reversed Emission Lines, Eric C. Chipman, LASP, Univ. of Colo. - In an effort to understand why non-LTE calculations tend to predict self-reversals larger than those observed for resonance lines such as those of OI and HI, we have made non-LTE computations of line formation in the presence of an oscillatory velocity field of varying amplitude and wavelength. Velocities required for significant reduction of the computed self-reversal are not very different from the limiting case of macro turbulence. We also discuss possible effects of non-Gaussian, small-scale velocity fields on computed line profiles and effects of horizontal variations in velocity.

11.05.06 COPERNICUS Observations of Chromospheric Lines in Late-Type Binaries, E. W. Keibler, Princeton Univ. Obs. - High resolution spectrum scans (0.05 A) of Lyman-alpha in the RS CVn systems HR 1099 and UX Ari were obtained with OAO-C in September, 1979. Preliminary results indicate both systems possess measurable emission which varies in intensity over time scales of less than a day. Simultaneous scans of Mg II (2800 A) at moderate resolution (0.51 A) were also obtained and showed variable and asymmetric profiles. Multiple velocity components were frequently observed in both systems' Mg II profiles and may indicate a flare-like ejection phenomenon. These observations were undertaken as part of an international monitoring project aimed at studying variable chromospheric activity in these two systems. Tentative correlations between the satellite and ground-based radio and optical observations will also be discussed. This research was supported by NASA contract NAS5-23576.

11.06.05 Model Chromospheres and Photospheres of Selected C and K Giants, W. L. Kelch, J. L. Linsky, G. S. Basri, JILA, NSH & Univ. of Colo., H. Y. Chi, NASA/Goddard, S. P. Karkas, NASA/CGO and UCLA, and I. Penumatch, KPOD.