for M and MS stars, respectively, with Tc. We have tested the hypothesis that Tc is produced in M stars by a mini S-process in which most S-process elements are not appreciably enhanced. Detailed calculations of neutron capture sequences predict less Tc than is observed but there seems to be no other way to produce Tc in M stars. The suggestion by Malaney and Lattanzio that Tc is produced by photofission of Th and U is limited by the initial abundance of those elements to values below what may be produced by the mini S-process.

65.05 Iron and Oxygen Abundances in Two Metal-Poor K Dwarfs
W. Spiesman, G. Wallerstein (U. Wash.)

We have derived oxygen abundances from the [OII] line at 6300 Å in two metal-poor K dwarfs, HD 25329 and HD 134440. The spectra were obtained with the KPNO 4-m echelle spectrometer and long camera yielding a resolution of 34,000 and a S/N of about 100. Model atmospheres with Te = 4770 were appropriate to both stars, whose metallicities were found to be [Fe/H] = −1.9 and −1.7 for HD 25329 and HD 134440 respectively. Our oxygen abundances then are [O/Fe] = 0.5 and 0.6 for the two stars. These values are more in line with [O/Fe] as seen in similarly metal-poor red giants than those reported in metal-poor subdwarfs by Abia and Rebolo.

Session 66: Stellar Model Atmospheres and Evolution Display Session
Grand Ballrooms I & II

66.01 The SDSC Grid from [−5] to [+1] at 2 km/s
R.L. Kurucz (Harvard-Smithsonian CfA)

I have used my newly calculated iron group line list together with my earlier atomic and molecular line data, 58,000,000 lines total, to compute new opacities for the temperature range 2000K to 200000K. Calculations have been completed at the San Diego Supercomputer Center for 56 temperatures, for 21 pressures, for microturbulent velocities 0, 1, 2, 4, and 8 km/s, for 3,500,000 wavelength points divided into 1221 intervals from 10 to 10000 nm, for scaled solar abundances [+1.0], [+0.5], [+0.3], [+0.2], [+0.1], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [+0.0], [−0.5], [−1.0], [−1.5], [−2.0], [−2.5], [−3.0], [−3.5], [−4.0], [−4.5], and [−5.0] (log abundance of elements heavier than helium relative to solar). I have rewritten my model atmosphere program to use the new line opacities, additional continuous opacities, and an approximate treatment of convective overshooting. Opacity can be interpolated as a function of depth-dependent microturbulent velocity. The opacity calculation was checked by computing a new theoretical solar model that matches the observed irradiance. Thus far I have completed a grid of 7000 model atmospheres at 2 km/s for all the abundances, for the temperature range 3500K to 50000K, and for log g from 0.0 to 5.0. This grid will allow a consistent theoretical treatment of photometry from K stars to B stars. Preliminary results are reported for many photometric systems. Work is underway on grids for other microturbulent velocities. Microturbulent velocity strongly affects the interpretation of Cepheid and RR Lyrae photometry. I had hoped to have CD-ROMS of the models, fluxes, and colors available in the near future, but I have not been able to obtain funding from NASA.

66.02 Three-Dimensional Magnetostatic Equilibrium
B.C. Low (HAO/NCAR*)

The equations describing a broad class of magnetostatic equilibrium states in non-symmetric, three-dimensional geometry are derived. In the one-fluid magnetohydrodynamic approximation, these equations describe the static balance of the Lorentz force by the pressure force and a body force described in terms of a potential which is completely free to be prescribed. Originally motivated by the desire to describe realistic, long-lived structures in the solar atmosphere, these equations have ready applications to other astrophysical systems which are intrinsically three-dimensional. Among these are the obliquely rotating magnetosphere under the gravitational influence of a central star and the magnetosphere in the rotating frame of a binary system. In some cases, the governing equations are reducible to a second order, elliptic partial differential equation in one scalar unknown. This equation is non-trivial to solve but it is a first step to the explicit construction of three-dimensional magnetostatic atmospheres.

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66.03 Photon Bubbles: Overstability in a Magnetized Atmosphere
Jonathan Arons (UC Berkeley and IGPP/LNL)

A linear WKB stability analysis of an isothermal scattering atmosphere immersed in a strong magnetic vertical field, supported against gravity by radiation pressure, shows that the entropy mode of the atmosphere is overstable, forming rising buoyant regions of depressed density filled with radiation. The most unstable modes form fingers elongated along the magnetic field, oscillating with frequency ω ≈ t^2/kh when kh ≫ 1, where k is the wavenumber, h is the isothermal scale height and t is the photon diffusion time over the length h. The most unstable mode has growth rate Γ ≈ (t^2/t^2)U(kh)^2, when t >> t^, sound crossing time over the scale height. The wave's propagation and instability both have their origin in the radiative heat flux, which systemically transfers radiative energy from high to low density regions, thus progressively increasing the buoyancy. It is shown that when the magnetic field is very weak, the unstable entropy mode becomes a damped g-mode, and a threshold magnetic field strength for instability is estimated. The results are applied to the onset of photon bubble growth in the polar columns of accretion powered pulsars.

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66.04 Hydrodynamic Studies of Accretion onto ONeMg White Dwarfs using a Large Nuclear Reaction Network
S. Starrfield, M. Politano (ASU), J. W. Truran (UT), W. M. Sparks (LANL), and A. Weiss (MPI, Garching)

We have performed studies which examine the consequences of accretion, at 10^9M_☉ yr^-1, onto ONeMg white dwarfs with masses of 1.0M_☉ 1.25M_☉ and 1.35M_☉. In these studies we used our Lagrangian, hydrodynamic, one-dimensional computer code that now includes a network with 89 nuclei up to 44Ca, elemental diffusion, and new opacities and equations of state. Our initial abundance distribution was taken from Weiss and Truran (ApJ 238, 178, 1990) and Nofar, Shaviv, and Starrfield (ApJ 369, 440, 1991) and was used to provide a mixture that was enriched to 50% in