

07.05.04 Evolution and Secular Stability of Stellar Models Crossing the Hertzsprung Gap. D. LAUTERBORN Hamburg Obs. and R.A. SIQUIG, Washburn Obs. - A real unstable eigenvalue has been found in the secular eigenvalue spectrum of stars with mass $M = 4, 6$ and $8 M_{\odot}$ evolving through the Hertzsprung Gap. Our interpretation of this phase of instability is that it is linked to the existence of multiple solutions for stars in thermal imbalance. This is analogous to the connection between secular stability and multiple solutions that has been shown to exist in static models. An extension of the classical Poincaré linear series concept to linear series of stellar models in thermal imbalance is formulated. The numerical computations have been carried out at the Instructional and Research Computing Center of The Ohio State University, the Computing Center of the University of Hamburg, and DESY.

07.06.06 Does the System Theta Virginis Represent a New Class of Pulsation Star? W. R. BEARDSLEY & F. R. ZIZKA, Allegheny Observatory, U. Pittsburgh. - Spectroscopic observations of θ Vir obtained with the Keeler reflector and spectroscope at the Allegheny Obs. indicate that the system is at least triple. The lines of only one component are present in the spectrum and these lines are extremely narrow. This star evidently belongs to the excessively numerous group of sharp-line early A stars. Spectroscopic orbital elements are presented for a long period of about 14 years. Analysis of the scatter in the residuals from this orbit has led to the discovery that a regular radial velocity variation also exists with a period of 0.15 day. Evidently this represents a pulsation in a vibrational mode. Other sharp-line stars also appear to have ultrashort periods. Observations are needed in an effort to resolve the 14-year companion.

07.07.06 AM Herculis, an Unusual Rapid Variable. R.A. BERG, U. Roch. - High speed photometry of AM Herculis reveals a complex variability in the light and color of the star which is characteristic of the cataclysmic or white dwarf variables. Many periodicities, in the range $.0015 < \nu < .03$, exist in the light curve; a few of the same periods exist in the color curve. These characteristics, its blue color and its high galactic latitude suggest that AM Her is not an RW Aur-type variable as indicated in the General Catalog of Variable Stars.

07.08.05 On the Variations in the Spectra of Ap Stars. R. STEINITZ, NASA Goddard S.F.C. & Ben Gurion U., & K.B. GEBBIE,* JILA. - We explore the possibility that variations in the line spectrum over the cycle of

an Ap star reflect simply changes in the ionization equilibria. This may be understood if we consider two broad classes of ionization equilibria: (1) collisional ionization and photorecombination and (2) photoionization and photorecombination. The first type is usually a strong function of temperature, the second mainly of density. Which type of equilibrium obtains may depend crucially on the optical depth in certain ionizing continua or lines. Two ions of similar ionization potential may thus respond very differently to changes in temperature and density, depending on their atomic cross sections. Moreover, a given ion may respond differently as control of ionization shifts from photoionization to collisions. Since the magnetic field at the surface of an Ap star cannot be uniform, we can expect variations in the temperature-density relation over its surface and hence changes in the observed spectrum as the star rotates. Applying the same reasoning, we may explain the differences in spectra that occur from one Ap star to another.

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07.09.06 The Triple System 20 Leo. F. C. FEKEL, U. Tx. Austin, B. W. BOPP, U. Toledo. - The known visual double and δ Scuti variable 20 Leo (HR 3889) is a spectroscopic triple system. The short period pair has a nearly circular orbit of period 4.15 days and minimum masses of $1.8 M_{\odot}$ each. The individual velocity measures suggest that the visual companion is the δ Scuti star. The spectral type of both short period components is about F2 IV-V; the visual companion is an A dwarf. All three stars have $v \sin i < 20$ km/s. The large minimum masses of the short period pair make eclipses a possibility.

07.10.06 Spectrophotometry of R Coronae Borealis During the Minimum of 1974. ROBERT S. PATTERSON, JOHN D. FIX, and JOHN S. NEFF, U. Iowa - Spectrophotometric observations of R Coronae Borealis were obtained as the star returned to normal brightness during the minimum of 1974. Absolute flux distributions and extinction optical thicknesses were determined for those nights on which observations were made. The optical thicknesses were found to be consistent with extinction by spherical graphite particles having radii of about 0.07 micron. No trend toward either an increase or decrease in particle size was detected. A close fit to the rising branch of the visual light curve of R CrB was obtained using a simple model in which the return to maximum brightness of R CrB is caused by the radiation pressure dispersal of a cloud of graphite particles.