22.03

Spectroscopy and Photometry of the Chromospherically Active X-Ray-Selected Binary HD111487.

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Recent spectroscopic observations of selected X-ray sources from the Einstein Medium-sensitivity survey (Silva, et. al., 1987 A.J., 93, 860) identified the star EU1247.0-05 48 = HD111487 as a possible chromospherically active binary. We have obtained 30 spectra at 5180 Å using the echelle spectrographs at the MHT, Mount Hopkins 60", and Oak Ridge 30" telescopes as well as spectra at λ I 6707 and H α, Radial velocities determined from the 5180 Å spectra yield an excellent single-lined orbital period of 1.0385 days. Concurrent BVRI photometry at Franklin and Marshall's Grundy observatory has revealed 3 eclipses, well phased with the spectroscopic orbit. Primary eclipses appear total with a depth of about 0.15 magnitudes in V. The primary appears to be a G5 main sequence star, the secondary a late K or early M star. A discussion of the RS CVn nature of this star will be presented.

22.04

The Mount Wilson Observatory HK Project: The Continuing Analysis of Rotation and Stellar Magnetic Cycles


At the Mt. Wilson Observatory 1.5m telescope we are measuring the Ca II H and K flux relative to the nearby stellar continuum in approximately 100 lower main sequence stars and about 200 evolved stars. A span of 22 years of time series data for the lower main sequence stars, begun in 1966 at the 2.5m telescope of Mt. Wilson Observatory, detail long-term chromospheric activity variations. Most of those stars exhibit periodic or apparently periodic long-term variations. Nightly data obtained since 1980 for the lower main sequence stars exhibit rotation modulation over eight independent seasons. Seasonal data reveal axial rotation and in a few cases, differential surface rotation.

In the survey of evolved stars, differences in the stars' mean annual averages of magnetic activity suggest the presence of long-term variations. Rotation is also revealed from the nightly flux monitoring of the evolved stars. The post-main sequence evolution of activity and angular momentum can also be studied from those data. We will present results from the program time serial monitoring of chromospheric flux.

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22.05

Radiative Transfer Modeling of Spectral Subtraction

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The spectral subtraction technique is examined through the use of radiative transfer modeling. The subtraction technique, often used in the analysis of active star spectra, consists of synthesizing the observed stellar spectrum with combinations of shifted, weighted, and Doppler broadened standard star spectra. This synthetic spectrum is then subtracted from the active star spectrum. The result is usually excess emission in activity-sensitive lines such as H-alpha, H-beta, and Ca II H; the excess emission is presumed to arise from extratopospheric activity. This technique was evolved as a way of simply removing spectral contributions of inactive companion stars and double-lined binary systems as it avoids the complexities of a complete spectral synthesis.

22.06

The Stellar Observing Program of the HAO/Lowell/AFGL Solar-Stellar Spectrophotometry Project (57)


With the goal of extending studies of solar-like variability to later type stars, synoptic observation of 34 lower main sequence dwarf and subgiant stars was started at the Lowell Observatory 42-inch telescope in the fall of 1988 ("rotation mode"). Spectra from the instrument will be used to investigate the relationship between rotation, convection and evolutionary stage in the operation of stellar dynamos. About half the fall 1988 stars are also being observed with the Mt Wilson HKP-2 spectrophotometer, and these observations will be used to intercalibrate the two instruments. These stars are also known to exhibit rotational modulation of the Ca II H and K lines. The S^2 instrument collects information over the wavelength ranges λ3900-λ4050 (BLUE camera) and λ3900-λ4000 (RED camera). A variety of strong spectral lines of Mg, Na, H, and Ca II are included in the range of the RED camera, and will be instrumental in extending studies of stellar chromospheric variability to later spectral types.

Single observations from a supplemental catalog of lower main sequence dwarf and subgiant stars are accumulated at the rate of five to seven per night as time permits. These data will be integrated into the project data base along with the synoptic observations, and eventually will provide spectrophotometric data for another 150 - 200 stellar targets. These "survey mode" spectra are intended for use in the future for study of magnetic cycle variations of late-type stars.

Integration of the spectrophotograph and data system into the Lowell facility was completed during July 1988, and the stellar observing program was initiated on 1 September 1988. This first fall season is expected to end on 31 December 1988 with the accumulation of approximately 2000 spectra from 90 nights distributed over a four-month period.

22.07

The HAO/Lowell/AFGL Solar-Stellar Spectrophotometer


A special purpose instrument intended for the study of magnetic activity cycles in both the Sun and other stars has been constructed and integrated into the Lowell Observatory 42-inch telescope facility in Flagstaff, Arizona. This system comprises the Lowell Observatory 42-inch telescope, which is used in its f/16 configuration, a Focal Plane Assembly (FPA), a Spectrophotograph Assembly (SGA) coupled by a single fiber-optic to the FPA, a Calibration Facility (CF), and a Solar Feed Assembly (SFA). The system is pointed and guided by means of an ISIT camera attached to the FPA, and the system is controlled from an observer's station located near the SGA in the former coude room of the building.

The SGA consists of two spectrographs (BLUE and RED) which are used simultaneously. The BLUE spectrograph is a conventional Litrow configuration optimized for the H and K lines of Ca II, while the RED

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