intensity fluctuations. It is found that the line broadenings take place when they are red-shifted. This suggests that CaII H and K lines are broaden when the umbral chromosphere falls into its own photosphere.

(4) The fluctuations of the peak intensity ratio are found to be firmly associated with their peak intensity fluctuations. Our correlation study shows that the umbral chromosphere becomes optically thicker when it falls, while it becomes optically thinner when it rises during the oscillations.

Analysis of High Resolution Balmer Line Spectra of a 3B Flare

Sang-Woo Lee and Hong Sik Yun
Department of Astronomy, Seoul National University
Ju Hu
Department of Astronomy, Nanjing University

We have analyzed time series of Balmer line profiles taken from a 3B flare, appeared in Noaa Region 6891 on the 27th of October, 1992. Each set of the spectra was taken simultaneously for the first 10 minutes of the flare event by multi-channel spectrograph attached to the Solar Tower Telescope of Nanjing University. A total of 22 sets of and lines has been scanned by PDS to make their absolute intensity calibration.

Our analysis shows that the flare has reached its maximum activity in about 1 min. after its emergence. At the maximum the average electron temperature is found to be 35000 K and the red-shifted radial velocity reached to 40km/sec. After the flare maximum the line intensities, radial and turbulent velocities were declined gradually with time. The radial and turbulent velocity curves obtained from profiles are presented along with their integrated intensity curves. finally, their physical implications will be discussed.

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CCD photometry of δ Scuti variables in the open clusters : V650 Tau in Pleiades

Seoung-Li Kim and See-Woo Lee
Department of Astronomy, Seoul National University

Real-time CCD differential photometry was carried out for a Scuti variable V650 Tau with 60cm reflector in SNU observatory. Total 3751 B differential magnitudes were taken on 14 nights between November and December 1993(about 81 hours of observations). We obtained very precise data($\sigma_m \leq 0.005^m$), because the comparison, check and variable stars were observed simultaneously(i.e. three stars are located in the same CCD field).

By applying the Fourier method and the multiple-frequency linear least square technique, we derived five frequencies of f_1=17.0441 c/d, f_2=18.4952 c/d, f_3=25.2950 c/d, f_4=28.7725 c/d, f_5=32.6328 c/d. We calculated the pulsational constant (day) for each frequencies from the observed parameters(T_{eff}, Log g, M_{bol}) and estimated the pulsational modes comparing these values with the theoretical ones of Fitch(1981). Our result shows that V650 Tau pulsates in

two radial(F,3H) and three non-radial modes simultaneously. Also we derived some physical properties of V650 Tau such as the mass(1.7 M⊙) and the radius(1.6 **M⊙)**

We note that the strong decrease of the amplitude of the f_1(F-mode) and the strong increase of the amplitude of the f_5(3H-mode) relative to the previous data (Belmonte et al. 1993, Michel 1994) It is clearly indicated that V650 Tau experiences the mode-switching between F-mode and 3H-mode.

VRc Photometry of the Dwarf Cepheids

Chul hee Kim

Department of Earth Science Education, Chungbuk National University, Korea

Michael D. Joner

Department of Physics and Astronomy, Brigham Young University, Provo, UT 84602, U.S.A.

Among large amplitude δ Scuti variables, photometric observations for four bright variables of AD CMi, EH Lib, XX Cyg, and YZ Boo were secured by utilizing the VRc color system, By using the Kurucz model atmosphere grid, atmospheric parameters of these variables were determined for those data in the literature obtained by observing with $ubvy\beta$ color system. Also synthetic color indices of (V – Rc) corresponding to different effective temperature, surface gravity, and metallicity were calculated by using the flux calculation by Kurucz. This result was used to derive the theoretical [Fu,(V-Rc)] relationship and compared with the empirical [Fu,(V-Rc)] relationship derived by using the standard angular diameter stars. As applied to classical cepheids, we tried to estimate the distance and radius of four variables by comparing the angular radius variation calculated from our [Fu,(V-Rc)] relationship with the radial displacement curve from radial velocity data in the literature, We could obtain the reliable result for AD CMi and it was found that, for other three variables, there are large phase shifts between two different variations.

Intensity Variation of the SiO MASER
Line of Long Period Variables

Kim, EunHyeuk and Lee, Sang-Gak

Department of Astronomy, Seoul National University

In principle, both radiation and collisions are capable of pumping the SiO masers. In order to check which pumping mechanism is more efficient, we observed the time variation of the line (v = 1, J = 2-1) intensity of SiO molecule for about 80 long period variables with wide range of period, and compared SiO maser line intensities with their optical light variation. Level populations were calculated by the rate equation for our model including the 3 vibrational states with 7 rotational states of each vibrational state. Thought solving the radiative transfer equation with the Sobolev approximation, we estimated the line profiles emerging from an expanding envelope for several transitions.