

tational influence of two massive bodies. The main application for the problem is the case of the Trojan asteroids, which can be found around the triangular equilibrium points of the Sun - Jupiter system. The shape and structure of the region of stability around one of the triangular equilibrium points (L_5) is studied numerically.

The stability region is defined as the set of points in the primaries' orbital plane, which if chosen as initial positions with zero initial velocity, the resulting orbits stay in the neighborhood of L_5 for at least 300 revolutions of Jupiter. The structure is characterized by a stability index, the ratio between the escape time of the third body and the final integration time. It is shown that islands and braches are present. The effect of increasing final integration time and increasing spatial resolution is also investigated.

Session 45: Variable & Other Stars

Display Session, IRC Lobby

Thursday

45.01

Synoptic High-Sensitivity Polarimetry of Very Bright Stars

J.C. Kemp, G.D. Henson, D.J. Kraus, M.H. Dunaway (U. Oregon)

We present intensive high-sensitivity ($\Delta p \lesssim 0.001\%$) polarization data over 2-3 years on Vega, Arcturus, Procyon, and Regulus, plus some photometry. Aims are to probe low-level pulsation and spot effects; a long-term hope is to sense dark orbiting bodies by polarized reflected light. With much data subsequent to Kemp et al 1986, ApJ 301, L35, in Arcturus we see a persisting ~ 46 -day variation; but the power spectrum has sharp splittings. At present we propose a multimode pulsation. In Vega, over 300 nights' data 1985-87 show a possible ~ 1 year effect and a very slow or secular variation of $\Delta p \sim 0.001\%$; this could relate to evolving or orbiting blobs in the IRAS-discovered circumstellar cloud. In Procyon we see variation on an apparent ~ 80 -day time scale and also a longer or secular change. The program continues.

45.02

Discovery of Optical Circular Polarization in Lambda Andromedae

G.D. Henson, J.C. Kemp, D.J. Kraus, M.H. Dunaway (U. Oregon)

We find this RS CVn-type binary star to have variable broadband optical circular polarization, of amplitude 0.002 - 0.004%, based on 59 nights' data during 1982, 1985, and 1986 (Kemp et al 1987, Ap. J. Letters) in press). The variability is compared with contemporaneous light curves. Ordered magnetic fields of possibly ~ 1 kilogauss, in large starspots, appear to be present at times. The polarization and light curves were markedly different in different years, owing to evolution of the spot geometry. The patterns switched from predominant variation on the 54-day rotation period to double-peaked curves (period 27 days); but we see a curious anti-correlation between the variation time scales of the light and polarization. A qualitative model for the

starspot geometry is offered for one case, and the relation to previous broadband optical circular polarization measurements of the solar disk and sunspots (Kemp et al 1987, Nature, 326, 270.) is discussed.

45.03

Epsilon Aurigae: Pulsations and the Post-Eclipse(1984-1987) Polarization and Light Curves

D.J. Kraus, J.C. Kemp, G.D. Henson, M.H. Dunaway (U. Oregon), J.L. Hopkins (Hopkins Phoenix Obs.), P.C. Schmidtke (Arizona State U.)

We present post-eclipse linear polarization observations in the U, B, and V bands and V band photometry of the singular long period (27 yr) eclipsing binary Epsilon Aurigae. The primary star is known to be an irregular pulsator and the presence of pulsation effects complicated the polarization curves for the 1982-1984 eclipse (Kemp et al 1986, Ap. J. Letters), 300, L11). Polarization and light variations due to the pulsations are continuing in the post-eclipse data. We compare the V band polarization and light curves and discuss the correlations between them. Power spectra of the V band polarimetry and photometry show multiple periods present with many periods coincident between the two data sets. Prominent candidate periods are roughly 480, 100, 80, and 60 days. The presence of multiple periods and phase differences between the polarization and light variations in relation to multimode pulsations (both radial and nonradial) in the primary star is qualitatively discussed.

45.04

IUE Low-Dispersion Spectra of Supernova 1987A

D.M. Crenshaw, G. Sonneborn (CSC and IUE/GSFC), R.P. Kirshner (CfA)

Ultraviolet spectra of Supernova 1987A in the LMC were obtained with the International Ultraviolet Explorer (IUE) beginning on 1987 Feb 24.82 UT. The evolution of the low dispersion spectra (which cover the wavelength range from 1200 to 3300 Å at a resolution of 6 Å) is presented. In addition to the ultraviolet data, the optical light curve as determined by the IUE Fine-Error Sensor (S-20 photocathode) is also shown.

The ultraviolet flux decreased dramatically during the first two weeks after discovery: at 1300 Å the flux decreased by a factor of 500 in 3 days; at 1875 Å by a factor of 1000 in 6 days; and at 2850 Å by a factor of 500 in 13 days. As of 1987 April 1, the spectrum at wavelengths shortward of 2600 Å was still dominated by the flux from nearby LMC stars. However, the spectrum at longer wavelengths was clearly dominated by the supernova, and the flux was at least an order of magnitude greater than that expected from the nearby stars. The flux from the supernova at 2850 Å from 1987 Mar 9 to 1987 April 1 remained remarkably constant to within a few percent.

45.05

Millisecond X-ray Binary Pulsars

K.S. Wood, J.P. Norris, P. Hertz (NRL), P.F. Michelson (Stanford)

We present data analysis techniques used to search in the HEAO A-1 and other data bases for millisecond binary X-ray pulsars. These methods overcome uncertainty in the knowledge of binary orbit parameters, including the worst case of total ignorance of the orbit, to limits imposed by the computational resource available. Results obtained to date using fast timing data from HEAO A-1 on bright bulge sources and other binaries such as Cygnus X-3 are summarized. Binary pulsars with spin periods in the milli-