PULSATIONAL PROPERTIES OF GP AND

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We have carried out simultaneous *uvby-β* photometry for the high amplitude δ Sct star GP And. Periodograms for this star have been constructed using the Discrete Fourier Transform method. The classical O–C method has also been used to study the stability of the fundamental pulsation. It is found that the pulsation of this star can be well described by means of a quadratic ephemeris with the period increasing at a rate of $(1/P)(dP/dt)=13.0(\pm2.8)\times10^{-8}$ y^{-1} over the last nineteen years. Intrinsic b–y, m_1 and c_1 values are derived and the physical parameters of this star are determined.

VLA OBSERVATIONS OF CYGOB2 No. 5: DETECTION OF A WEAK RADIO COMPANION AND NEW OBSERVATIONS AND MODELS FOR THE MAIN COMPONENT

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We present Very Large Array observations of the contact binary star Cyg OB2 No. 5 obtained over the last four years. A weak ($\sim$ 0.6 mJy at 6-cm) radio companion has been detected $\sim 0\farcs8$ to the NE of the known main radio component. However, most of the radio continuum and the variability appear to be associated with the main component (that coincides in position with the optical contact binary). The centimeter continuum emission of the main component increased in 1989–1992 to levels similar to those observed in 1983–1986. The radio emission seems to alternate between a "low" and a "high" state with a period of about seven years. We derived its brightness temperature from 3.6-cm observations during "high" state, obtaining $T_B = 100\,000 \pm 30\,000$ K. This large value rules out a possible thermal origin for the radio continuum emission. Several models are discussed to account for the characteristics of the radio emission from the main component. The most satisfactory consists of a synchrotron-emitting envelope produced near the outer region of the free-free radio photosphere ($\sim 10^{15}$ cm at cm wavelengths).

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PERIOD VARIATIONS AND DUPLICITY OF THE δ SCUTI STAR VZ CANCRI

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New photoelectric photometry and new times o maximum light are reported for the δ Scuti-type sta VZ Cnc. Times of maximum light available for th last five decades have been studied. They show a very suggestive sinusoidal variation with a period o about 18 000 days (49.3 yrs.) and an amplitude o 0.0053 days. As an explanation, light time effects ir a binary system are preferred over non-linear com binations of pulsational frequencies since the forme is simpler, while the latter lacks numerical and theo retical grounds. Also other fits of the (O–C) diagran have been considered such as abrupt period change or a sloping linear fit. However they were found un realistic and less significant than the sinusoidal fit. I the binary interpretation is further investigated on could conclude that the putative companion woul be a white dwarf or a main sequence star with M_2 $\leq 1\ M_\odot$. It is stressed that the predicted amplitud variation due to orbital motion is only 1.1 km s^{-1} thus very difficult to detect due to its long time scal and to the presence of the 40 km s^{-1} variation du to the pulsation of the primary star.

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THE INTERPRETATION OF OBSERVATIONS OF ICE AND SILICATE IR FEATURES AND POLARIZATION ACROSS THEM IN THE SPECTRA OF PROTOSTELLAR OBJECTS BN AND AFGL 2591

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Calculations of dust absorption features of ice (λ = 3 μm) and silicate (λ = 10 μm, 20 μm) are presented, including the linear polarization across the features. An interpretation is made of observations of the protostellar objects Becklin-Neugebauer (BN) and AFGL 2591.

The dust model considered consists of a power-law size distribution of spinning spheroidal grains, which are partially aligned with the local magnetic field via Purcell's suprathermal spin-up mechanism. Core-mantle, porous and composite particles are investigated in the Rayleigh approximation. In the

ases of composite and porous grains, the effective efractive indices are computed by the approximate Bruggeman rule.

The influence of grain chemical composition, elonation and structure is investigated. Differences n polarization between composite and core-mantle nodels are found. The mixing of grain materials moothes the individual spectral features of chemcal components. Addition of graphite to silicate rains causes the 10 μm feature to shift to shorter avelengths, while further increase in the fraction f graphite also shifts to 20 μm feature to shorter avelengths and decreases its strength. Increasing he elongation of the grains reduces the negative poarization of the 3 μm ice feature, shifts both silicate features to longer wavelengths, and increases the strength of the the 10 μm and 20 μm peak positions to longer 20 μm band. Increasing the porosity leads to similar effects.

It is found that the grain models presented here are in good agreement with observational data for the BN and AFGL 2591 objects. The absence of polarization excess near 3 μm for AFGL 2591 is attributable to a decrease in elongation of large grains as a result of coagulation. Attention is directed to the real distribution of interstellar dust grains with respect to the elongation parameter. The determination of this distribution function and its evolution during the processes of accretion and coagulation are necessary.

LIST OF ABSTRACTS