

## Characteristics of MHD Wave Energy Generated in Late Type Stars

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An attempt has been made to examine the characteristics of acoustic and MHD waves generated in stellar convection zones ( $4,000\text{ K} \leq T_{\text{eff}} \leq 7,000\text{ K}$ ,  $3 \leq \log g \leq 4.5$ ). With the use of wave generation theories formulated by Stein (1967) for acoustic waves, by Musielak and Rosner (1987, 1988) for MHD body waves, and Musielak *et al.* (1989a, 1989b) for MHD tube waves, the energy fluxes are calculated and their dependence on effective temperature, surface gravity, and magnetic field strength are analyzed by using 2-D or 3-D optimization techniques. According to our analysis, it is found that the acoustic types of waves are likely to be responsible for the chromospheric heating, the Alfvén types of waves, for the heatings of the transition region and corona.

## The Observation of SiO Maser Emissions for 13 Mira Variables

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We observed the intensity variation of SiO maser emissions ( $v=1$ ,  $J=2 \rightarrow 1$ ) of 13 Mira type variables with one month interval from April 1989 to November 1990 through the 13.7m Radio Telescope at DRAO. More than one period were covered for all sources except VX Sgr.

We confirm the characteristics that the intensity variation of SiO maser emission has a phase delay about 0.2 from that of optical intensity. And we present a possibility of minor variation of the intensity with about  $1/7$  optical period.

The Missing Maxima appear as real feature. The shock at the shell by the material ejected from central star may disassociate SiO molecule, and cause the phenomena.

From the comparison with the other transition of SiO ( $v=1$ ,  $J=1 \rightarrow 0$ ) observed at Yebes Radio Observatory, Spain, we find a linear relation between those peak intensities of each sources. It may be interpreted the SiO emission is saturated when peak intensity.

## Determination of Spectral Indices Sensitive to Atmospheric Parameters

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142 digital spectra of 113 standard stars with  $1\text{ \AA}$  resolution in  $\lambda\lambda\ 3,900\text{ \AA} \sim 4,150\text{ \AA}$  observed by Coude-feed telescope equipped with CCD detector at Kitt Peak National Observatory were analyzed to determine spectral indices sensitive to atmospheric parameters ( $T_{\text{eff}}$ ,  $\log g$ ,  $[\text{Fe}/\text{H}]$ ) using the IRAF (Image Reduction and Analysis Facility). The standard stars cover the temperature range from about 4,000 K to about 7,000 K, the surface gravity in  $\log g$  from 0 to 5, and the metal abundance  $[\text{Fe}/\text{H}]$  from  $-2.7$  to  $0.4$ . Pseudo-continuum ratio  $p(4038)/p(4093)$  and FeI (4045  $\text{\AA}$ , 4063  $\text{\AA}$ ), SrII(4077  $\text{\AA}$ ), and H $\delta$  (4101  $\text{\AA}$ ) lines were found to be useful for determination of atmospheric parameters.  $T_{\text{eff}}$  was estimated with  $\sigma = \pm 100\text{ K}$  for the best case and with  $\sigma = \pm$

1000 K for the worst case.  $\log g$  was estimated with  $\sigma = \pm 0.27$  for the best and with  $\sigma = \pm 0.63$  for the worst. And  $[\text{Fe}/\text{H}]$  was estimated with  $\sigma = \pm 0.29$  for the best and  $\sigma = \pm 0.63$  for the worst.

## On the Tidal Disruption of Dwarf Spheroidal Galaxies Around the Galaxy

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We use N-body simulations to investigate the tidal interaction between dwarf spheroidal (dSph) galaxies and the Milkyway galaxy. King models are adopted for the initial models for dSph galaxies and logarithmic and point-mass potential is used for the Galaxy. Our results indicate that dSph galaxies with cutoff radius much larger than the theoretical tidal radius are unstable and likely to be tidally disrupted on the Hubble timescale. However dSph galaxies can survive over a Hubble time if their cutoff radii are less than twice their tidal radii at perigalacticon.

## On the Mechanism for the Formation of Millisecond Pulsars in Globular Clusters

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Core of globular cluster is an ideal place for the close encounters between stars. The outcome of tidal capture can be stellar mergers, close binaries between normal stars (W UMa type), cataclysmic variables composed of white dwarf and a normal star pairs. Stellar mergers can be the origin of blue stragglers in globular clusters. Low-mass X-ray binaries would eventually become binary pulsars with short pulse periods after the neutron star accretes sufficient amount of matter from the companion. However, large number of recently discovered isolated millisecond pulsars (as opposed to binary pulsars) in globular clusters may imply that they do not have to gain angular speeds during the X-ray binary phase. We propose that these isolated millisecond pulsars may have formed through the disruptive encounters, which lead to the formation of accretion disk without Roche lobe filling companion, between a neutron star and a main-sequence star. Based on recently developed multi-component models for the dynamical evolution of globular clusters, we compute the expected number of various systems formed by tidal capture or direct encounters as a function