Time Dependent Flare Signature in Hydrogen Balmer Lines*

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Canfield et.al.(1993) suggested use if Ha emission line profile for dis criminating between the Ha emission caused by precipitaing high energy particles(EP) and that due to high cornal pressure(HP). Leka et al.(1993) and de la Beaujardiere et.al. (1993) have implemented this spectral diagnostics to seperate the region of EP and that of hp based on data of Ha imaging spectroscopy.

In the present work, we address the same problem but with time resolution offered by the multi-chancel spectrograph at Nanjing University which was used for hydrogen Balmer line observation of the white-light flare occurred in NOAA 6981 on Oct.27.1991. It is found that the Balmer emission lines with central reversal, the signature of ep, are forst seen at the maximum phase and then the single-peak line profiles, the signature of hp, follow. We also found a weak absortion feature to the blue side that accompanies the hp profile.

On the basis of the relative position of the slit to the continuum and Ha brightening, it is argued that the wp event and the hp event are cospatial and that the observed change of spectral line profiles with time should reflect a casual relationship between them. The absorption feature shown up to the blue side is interpreted as duw to cooling off of overlying material moving upward along the magnetic tube in the ep region, which in line with the Dopplergram observation. Overall dynamical picture conjectured from the present results is in good agreement with the "erupting filament model" for solar flares.

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Bright Part of Halo Luminosity Fuction Based on NLTT Proper-Motion Stars

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Luminosity fuction for field hako stars is essential for study of galaxy formation and evolution and as well as galactic structure study, but not yet uniquely determined. A recent work of Dahn et al.(1995) provides so far the best result for faint part if luminosity fuction from 64 parallax subdwarfs.

In this study we have derived the bright part of that utilizing Ryan(1991)'s photometric data for ~1755 NLTT stars. Among them 233 stars are found to be halo stars with tangential velocity larger than 220km/sec brighter than m_v=12.3 V/Vm method is applied to those stars and correction for hangential velocity limit, 0.514 is adopted from model 12 from bahcall and Casertanl(1986) of velocity ellipsoid with (σ_u=222, σ_v=114, σ_w= 108) for metal-poor field stars. Derived luminosity function is consistent with the result of Bahcall and Caserano(1986), which was derived from the data adopted tangential velocity limit to Eggen(1983)'s. Kinematic parameters of the sample used in the present lumionosity function determination are $<V>$=-228, σ_u=192, σ_v=84, σ_w=86, all in km/sec.

The Spatial Structure of the Globular Cluster System in NGC 4472

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One of the main intersts on the giant elliptical galaxies is how they formaed and evolved. A comparison between the spatial distribution of the globular cluster system(GCS) in galaxies and that of the galaxy halo light enables us to investigate the formation histories of GCS and galaxies. To date there are only small number of galaxies for which the spatial structure of GCS has been studied,and most previous studies suffered from the small sample problem. Here we present a study of the spatial structure of GCS in NGC 4472 based on a large sample of GCS.

Our sample includes ~1,300 GCs brighter than T1=22.5 mag selected from our deep wide-field Washington CCD photometry. Our sample has been devided into two groups(the metal-poor GC([Fe/H]<-0.5) and the metal-rich GC([Fe/H]>-0.5) to investigate the differences between two groups.

Radial distribution of the surface density of the GC shows that the metal-rich GC is spatially more concentrated than the metal-poor GC (the core radii of the metal-rich GC and the metal-poor HC are ~140″ and ~240″, respectively). The ellipticity of the metal-rich cluster decreases from e~0.8 to e~0 within R=150″ as the galactocentric radius increases, and increases to e~0.4 outward beyeond R=150″, while the ellipticity of the metal-poor clusters stays approximately constant around e ~0.4. the position angles (PA's) of the two groups show a significant difference in the inner region (R<300″), while the PA's of the two groups agree approximately (PA~140) in the outer region (R>300″). These differences suggest that the have different formation histories.

The galaxy halo loght shows quite different features from the GCs. The surface brightness of the galaxy halo light decreases more steeply than that if the GC. The median colors of the GCs get bluer outward. On the contrary the colors of the halo get bluer by a small amount outward in the inner region(R<180″) and become much redder outward beyond R=180″. the mean color of the halo is much redder than that of the GC. The ellipticity of the halo remain almost constant with a value of e~0.2, and the PA of the halo decreases slightly outward (PA~160°). these results imply that the halo and the GC in NGC 4472 formed via different processes.