

Time-Variation of the Atmospheric Diffuse Radiation

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In order to derive time dependence of the atmospheric diffuse radiation, which is consisted of the airglow continuum emission and diffusely scattered radiation of astronomical background, we have analyzed the meridian scan observations of the sky brightness at 5080Å and 5300Å. Amplitude of the time-variation becomes larger for lower elevation; maximum of the amplitude is found to be about $50S_{10}$ at 10° elevation. The time-variations for the two wavelengths are similar to each other; the atmospheric diffuse radiation attains maximum brightness at around midnight, and decreases slowly after midnight.

The observed brightness distribution of the diffuse radiation along the zenith distance is fitted to an empirical relation of two parameters. By marking the two parameters time-dependent, we describe the spatial and time variations of the atmospheric diffuse radiation. This enables us to make time dependent corrections in the reduction of zodiacal light brightness.

플레어 자기유체의 동역학적 특징과 자력선 재결합

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플레어(flare) 폭발 상(impulsive phase)에서 급격한 에너지의 변화가 일어나는 것이 관측된다. 이런 현상은 자력선 재결합의 기작으로 설명이 가능하다.

이차원 M.H.D. 입자 코드(2-D magnetohydrodynamics particle code)를 사용하여 자력선 재결합시 운동에너지의 변화를 알아보았다. 비정상확산 계수(anomalous diffusion coefficient)로써 자력선 재결합을 발생시켰다. 여기서 사용한 경계조건은 X경계에서 주기 조건(periodic boundary condition), Y경계에서 대칭조건(mirror boundary condition)을 사용하였다. 자기 유체는 단열상태에 있다고 가정하였다.

단열상태 하에서 자력선 재결합시 발생하는 자기유체의 운동에너지는 $t^{5.3}$ 정도(t 는 시간)에 비례하여 증가한다. 여기서 제시되는 값 $t^{5.3}$ 은 플레어 폭발상의 관측에서 제시하는 증가률(약 t^8)보다 작은데 이러한 사실은 단열상태의 조건보다는 주열가열(Joule heating) 및 복사 방출량을 넣은 조건을 사용하여야 함을 시사한다.

태양활동영역의 진화

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대류층 내부에서 일어나는 대규모적 대류나 순환의 다이나모과정으로 자장이 형성되는데 이 자기

장은 자기부력에 의해 태양표면으로 상승하면서 흑점, 플레어 및 홍염 등의 다양한 활동현상을 일으킨다. 본 연구에서는 이와 같이 표면활동 현상의 근원이 되는 태양활동영역의 진화과정을 단계적으로 살펴보고 초기단계에 관측되는 자력관의 상승현상이 태양대기층에 미치는 영향을 MHD 수치계산을 통하여 연구하였다. MHD 계산에는 질량, 운동량 및 에너지 보존식과 인덕션 식을 이용하였다.

Concentric Aperture Photometric Observations using the Narrow Band Filters of the Spherical Objects

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Using the medium and narrow Strömrgren-Crowford filters, we observed elliptical galaxies and globular clusters with the concentric aperture method. Among them elliptical galaxies M87 and M105 and the globular cluster M3 show the marginal increase of the colour index $b-y$, which means the central region is redder than the outer part. The metal index m_1 is more in M87 and M105 in the central region, which observing result may support the existence of super massive or heavy objects in the central region of these galaxies. However we could not find any variation in the late type elliptical galaxy NGC205 and a globular cluster M3. The metal poor and X-ray globular cluster M15 shows the redder $b-y$ and similar m_1 values in the central region.

Fragmentation of Large Scale Structure and the Spectrum of Cosmological Perturbations

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We examine the spectrum of cosmological perturbations which may give origin to a cellular observer-homogeneous self-similar structure in the Universe. We assume that this structure originates by successive fragmentations in the dark matter "ino" component, due to a process of Jeans instability. The fragmentation is characterized by the number of fragments(N) occurring at each step and by a characteristic "lagging time factor(τ)" at each successive fragmentation. In order to fulfil the observed spectrum of perturbations, at the present epoch, suitable values of τ are defined, the process is quite independent on the value of N . The initial spectrum of density perturbations is found to have a flat spectrum in mass with an upper and lower cutoff. The initial amplitudes of the perturbations, as well as the ones to be found at the era of decoupling between matter and radiation, are discussed.

Radial Color Variation of 3 LMC Globular Clusters

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Integrated radial color variations of 3 globular clusters(H4, ES0121-SC03, and LW79) in the