

We examined the empirical relationship between stellar activity and rotation period found in our earlier work for the lower main sequence stars to interpret it on the basis of a simplified astronomical dynamo theory.

From the analysis it is found that the magnetic field strength B_0 activated under the dynamo action is proportional to $(\Omega v \rho l)^{1/2}$ where Ω , v , ρ , l are the characteristic angular velocity, flow velocity, mass density and the scale of the dynamo active region, respectively.

Hydrogen Emission Spectra of Quiescent Prominences

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We have calculated the models of quiescent prominences which satisfy simultaneously the constraints of radiative transfer, statistical equilibrium and charge-particle conservation. The prominence is treated as an infinite slab of finite thickness, standing vertically on the solar surface illuminated on both sides by the photospheric, chromospheric and coronal radiation field. The effect of filaments in prominence on the spectral line emission has been examined by considering the fine geometrical structure. We will present the result of our calculation on hydrogen line emissions for the prominence model with filamentary structure.

회전하는 항성내부 철핵의 수축 모형

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초신성 폭발은, 질량이 $8M_{\odot}$ 보다 큰 별의 급격한 중력수축으로 시작된다. 기존의 구대칭 수축 모형은 상부 맨틀을 날리보낼 만큼 충분한 운동에너지가 중력에너지로부터 변환되지 않고 있다. 따라서 우리는 또 다른 에너지 변환기구로서 별의 회전효과를 고려하였다.

수축 모형은 크게 유체역학 방정식, 상태 방정식 그리고 중성미자 전달 방정식 등 세 부분으로 구성된다. 이들은 구형 좌표계에서 기술되었으며 특히 중성미자와 물질과의 상호작용은 상세히 취급되었다.

Uncertainties in the Star-Count Analysis

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We have examined how sensitively the extinction derived from the star-count depends on such factors as the plate limit, the size of counting reseaus, the non-linearity in the number distribution of stars with magnitude, and the angular resolution demanded by the given problem. We let the Poisson distribution portray the statistical nature of the countings, and chose the region containing globule Barnard 361 as an example field. Uncertainties due to combinations of the various factors involved in the star-count analysis are presented in graphic forms: Dynamic range in the extinction measurements by the star-count analysis is evaluated as a function of reseau size for varying plate

limits. Statistical errors involved in the star-count are analyzed in terms of the signal-to-noise ratio, the plate limit and the reseau size. Systematic errors due to the non-linearity in the number distribution of stars with magnitude are thoroughly analyzed, and a methodology is presented to correct for the effect of the systematic errors in the observed radial density gradient. The graphs are meant to be used in selecting proper size of the reseau and estimating errors inherent to the star-count analysis.

Efficiency of DRAO Radio Telescope

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In order to improve the antenna efficiency, we performed three kinds of works.

First, we adjusted the surface panel with the theodolite. The resultant surface random error is about $210\mu\text{m}$.

Second, we compensated the gravitational deformation by the computer control of subreflector. The corrected antenna temperature is nearly constant within 10% above 30° in elevation.

Third, a new pointing model was made by observing the SiO maser sources. The pointing error is 8 seconds of arc rms.

After above works, the aperture efficiency and the beam efficiency at 100GHz were found to be 30% and 43% respectively. Now the scientific observations can be performed with our telescope.

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〈研究論文〉

The Presence of Wielen Dip in the Disk Stellar Luminosity Function

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The disk stellar luminosity function is redetermined in order to check the Wielen dip is real or not, by mean absolute magnitude method utilizing the proper motion data of LHS catalog. The reduced proper motion diagram was used to exclude the contamination of the population II stars.

The derived luminosity function shows the similar dip in the magnitude range of $8 < M_B < 12$, with the one mentioned by Uppgren and Armandroff (1981) in the Wielen's (1974) luminosity function which was derived from the nearby stars. It is found that the most critical problem in the mean absolute magnitude method so far used, is that one relation between the mean absolute