

지구과학 교육과정의 구조화

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지구과학의 학문적 특성을 고려하여 개정된 고등학교 지구과학 교육과정을 분석하고 탐구학습이 가능하도록 이를 구조화한다. 이러한 구조화를 위하여 구조화의 중요성과 준거를 밝히고 고등학교 지구과학 교육과정에서 천문분야 단원을 중심으로 단원에 수준별 내용을 선정하고 이를 계열화함으로써 나선형조직(Spiral curriculum)이 가능하도록 하며 나아가 탐구학습의 구조화 모형을 제시한다.

태양풍과 지구주위의 공간

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태양은 복사에너지외에 다량의 하전입자를 태양풍의 형태로 방출한다. 태양풍은 또한 자기장을 수반하고 있다. 이러한 자화된 플라즈마와 지구 자기장의 상호작용은 지구 주위공간에 다양한 현상을 유발한다. 그 대표적인 것들 중에는 자기권의 형성, 오로라의 발생 및 지자기의 변화등이 있다.

여기서 간단하게 이들 현상에 내재해 있는 기본적인 물리적 성질을 취급하기로 한다.

펄스세기(Pulse Counting)의 기록을 위한 Apple의 주변접속기 제작

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광전측광은 직류 증폭방식과 펄스세기방식으로 구분할 수 있다. 어두운 별의 측광에서 유용한 펄스세기방식은 적절한 기록수단이 없거나 고가이므로 흔히 쓰이지 못하고 있다.

펄스세기방식의 기록 수단으로 개인용컴퓨터 Apple을 이용하기 위하여 만능계수기와 Apple간의 주변접속기를 제작하였다. 부수적으로 직류 기록식의 신호를 Apple에 접속하여 기록하는 것도 가능하다.

The Evolution of the Galactic Globular Clusters: I. Metal Abundance Calibrations

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Five different calibrations of metal abundances of globular clusters are examined and these were compared with metallicity ranking parameters such as $(Sp)_c$, $\langle S \rangle$, Q_{39} and IR-indices. Except for the calibration $[Fe/H]_H$ by the high dispersion echelle analysis, the other calibration scales are correlated with the morphological parameters of red giant branch. In the $[Fe/H]_H$ -scale, the clusters later than $\sim F8$ have nearly a constant metal abundance, $[Fe/H]_H \simeq -1.05$, regardless of morphological characteristics of horizontal branch and red giant branch.

By the two fundamental calibration scales of $[Fe/H]_L$ by the low dispersion analysis and $[Fe/H]_{As}$ by the spectral analysis of RR Lyrae stars, the globular clusters are divided into the halo

clusters with $[Fe/H] \lesssim -1.0$ and the disk clusters confined within the galactocentric distance $r_G=10$ kpc and galactic plane distance $|z|=3$ kpc. In this case the abundance gradient is given by $d[Fe/H]/dr_G \approx -0.05 \text{ kpc}^{-1}$ and $d[Fe/H]/d|z| \approx -0.08 \text{ kpc}^{-1}$ within $r_G=20 \text{ kpc}$ and $|z|=10 \text{ kpc}$, respectively. According to these characteristics of the spatial distribution of globular clusters, the chemical evolution of the galactic globular clusters can be accounted for by the two-zone (disk-halo) slow collapse model when the $[Fe/H]_L$ - or $[Fe/H]_{ds}$ -scale is applied. In the case of $[Fe/H]_H$ -scale, the one zone fast collapse model is preferred for the evolution of globular clusters.

Variation of Non-adiabatic Term during One Period of Pulsating Star

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The equations of pulsation are determined from the radial velocity curves and the phase diagrams of five pulsating stars. With these equations, the motions of pulsation and the other physical phenomena are explained. We calculate the non-adiabatic term during one phase and compare the parameters of these equations with respect to the radius of each star.

Photoelectric Photometry of ER Vulpeculae

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The eclipsing binary ER Vulpeculae was observed in yellow and blue light with the 40cm Cassegrain reflector of Kyungpook National University Observatory during the period from October 2 to October 31, 1983. A total of 222 yellow observations and 220 blue observations of ER Vulpeculae was obtained.

From the observed time of minimum the new light elements are deduced as; J.D. Hel. Min. $I=2440182.26039+0^d.6980932E$. The variations in its period are discussed. The characteristics of the observed light curves are discussed comparing with the results of previous observers.

A Solar Dynamo Model Based on Öpik's Convection Theory

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A theoretical formulation as to how stellar dynamo operation can be incorporated into Öpik's convection theory is presented. Within the framework a solar dynamo model is constructed, taking into account the effect of the differential rotation. It is found that the solar dynamo operates very effectively toward the lower boundary of the solar convection zone, generating a fluctuating magnetic field with an amplitude of about one thousand gauss and a period of 22 years. Finally, we discuss the advantage of the Öpik's theory over the conventional mixing-length theory in dealing with stellar dynamo.