frequencies we have been applied the power spectrum analysis in the frequency domain. For the frequencies determined from the power spectrum anaylsis, we again applied linear least squares fitting to the observed light curves and found best-fit amplitudes and phases for all input fraquencies. From the analysis we detected 4 pulsation frequencies for HR2107: $\nu_1$=7.390c/a, $\nu_2$=7.445c/a, $\nu_3$=14.770c/a, and $\nu_4$ =14.825c/a . From the comparison of the detected frequencies and amplitudes with those of Desikachary(1974), we have found that the pulsation frequencies of HR 2107 did not show any meaningful change. On the other hand, the amplitudes of all pulsation frequencies showed significandt difference with those of Desikachary (1974). This fact may suggest that the amplitudes of the pulsations have been changed during the past 20 years.

## 산개성단 NGC7039의 CCD 측광

강용우, 안홍배
부산대학교 지구과학과

산개성단 NGC7039 ($21^h09^m24^s$, +45° 47′ (1950.0), 25′ )에 대하여 DAO 1.8m('92.10) 및 소백산 61㎝망원경('96.9-12)과 보현산 1.8m망원경('96.10-97.01)을 이용한 CCD측광을 수행하였다. 전체 약 30′ ×10′ 영역의 별들에 대한 측광을 수행하였고, 성단의 밀집 지역과 외곽영역에 대하여서 V=~$19.5^m$정도의 흐린별까지 관측을 수행하였다. 이 성단에 대하여 색-등급도를 얻고, 거리와 나이를 구하였다. NGC7039는 E(B-V)=0.09, 거리 약 ~3.3kpc, 나이 $10^{8.2}$~$10^{8.4}$년이다. 본 연구에서 구한 E(B-V)는 Schneider(1987)가 uvbyH$\beta$측광계에서 구한 E(B-V)=0.09와 잘 일치하며 Hassan(1973)이 구한 E(B-V)=0.19와는 많은 차이가 보인다. Schneider와 Hassan은 NGC7039의 거리를 각 각 700pc 1.5kpc를 제시하였는데, Schneider는 밝은 별들에 국한하여 거리를 구하였고, Hassan의 경우 하부 주계열이 관측되지 않았기 때문에 동연령선 맞추기에서 주계열의 위치를 잘못 선정한 것으로 보인다. 고유운동에 의한 구성원 판별을 위하여 DSS자료에서 구한 별들의 위치와 본 관측에서 구한 별들의 위치를 비교하여 구성원 판별을 시도하였다.

## AN IR SOURCE WITHIN COMETARY GLOBULE CG4

S.S. Hong[1], W. T. Kim[1], S. H. Park[1], M. G. Lee[1] and H.G. Kim[2]
[1]Department of Astronomy, Seoul National University
[2]Korea Astronomy Observatory, Hwaam-Dong, Yusong-Ku, Daejon 305-348

This is a report on a discovery of point source inside cometary globule CG4, which is associated with HII region S185. By using the maximum correlation method we have de-convoluted the IRAS images at 60 $\mu$m and 100$\mu$m. Point spread functions(PSFs) at the two wavelengths are constructed from the corresponding brightness profiles of known IRAS point source 00556+6048 in the field. At both wavelengths normalized profiles of the de-convoluted brightness images are very close to the PSFs themselves.

We model the embedded IR source as a black body photosphere of total Luminosity $11.5L_\odot$ at temperture 1550K, which is surrounded by a dust cloud of total visual exinction 6.8 magnitudes. Radius of the blackbody photosphere is taken to be $1.07\times10^{16}$cm. And an $H_\alpha$ CCD image taken at the BOAO places the cloud boundary at $9.1\times10^{16}$cm from center. We let power-law $n(r)\propto r^{-p}$ describe the distribution of the cloud density $n(r)$ with distance r from the center. The exponent p is varied from 1.6 to 2.2. An approximate relation $Qabs\propto \nu^{-1.5}$ is used for dust opacity at wavelengths longer than 30$\mu$m. At wavelengths shorter than that the opacity of Adams and Shu(1985) is taken. Energy spectrum calculated from the model has reproduced the integrated IRAS fluxes at the four bands. Implications of the model will be discussed in the context of star formations.

## TWO-DIMENSIONAL SIMULATIONS OF THE PARKER INSTABILITY UNDER A UNIFORM GRAVITY

S. M. Lee[1], J. Kim[1,3], S. S. Hong[1], and D. Ryu[2]

[1]Department of Astronomy, Seoul National University

[2]Department of Astronomy & Space Science, Chungnam National University

[3]Korea Astronomy Observatory, San 36-1, Hwaam-Dong, Yusong-Ku, Daejeon 305-348

We have simulated the non-linear development of the Parker instability under a uniform gravity of an external roigin. Two-dimensional disk is composed of isothermal gas and magnetic field. The gravity is along the negative z-axis. The initial equilibrium distributions of gas density and magnetic pressure decrease exponentially with z, and field lines run parallel to the y-axis. According to linear stability analyses, the horizontal wavelength of the maximum growth rate is about 12 times the density scale height H. We thus set the computational domain to be 12H×12H. The whole range of 12H is divided into 128, 256, and 512 grides, and the simulation results with different grid size are compared to each other.

In the linear stage of evolution, initial random perturbations grow with a growth rate which agrees with the linear analysis predictions. At the end of the linear stage, main activities develop in the upper region. As the system gets into the non-linear stage, shock waves form in magnetic valley where velocity begins to disappear. Zero velocity also appears in magnetic wing. Non-zero velocity in the region (shoulder) between the valley and wing tend to buckle up the field lines. As time goes on, the area of the zero velocity regions increases, and the system gets relaxed. The configurations of magnetic field and density in the valley and the wing closely resemble those of the final equilibrium obtained by Mouschovias (1974). The evolution accompanies a reconnection of magnetic field lines. The converging flow drives the field lines in both shoulders close to each other, and numerical resistivity effects the reconnection. However, the reconnection does not make significant consequences on the final configurations.