of low mass stars through the tidal boundary. One signature of highly evolved cluster is thus a significant flattening of the mass function. The age measured by the half-mass relaxation time increases very rapidly from a characteristic value of ~ 100 at the final stage of disruption. This appears to be consistent with the sharp cut off near 10^8 yr in the distribution of the half-mass relaxation times for the Galactic globular clusters. We also consider the evolution of clusters containing massive dark remnants (i.e., white dwarfs or neutron stars). The efficient formation of three-body binaries among the degenerates and the relative flattening of the luminosity profile compared to the density profile, lead to postcollapse models with a sufficiently low concentration that the core may be resolvable.

* A research supported in part by the non-directed research fund of the Korea Research Foundation (1989).

Velocity Distribution of Dark Matter Galactic Halos

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We investigate the response of nondissipative dark matter galactic halos during the dissipational collapse of the baryonic matter in spiral galaxy formation, focusing on the velocity distribution of the dark matter in the disk of a galaxy like the Milky Way at the solar radius. We use N-body simulations with the total mass and z-component of angular momentum conserved. The initial distribution of dark matter and baryonic particles is a homogeneous mixture based on a King model. Then we force the baryonic matter to contract, forming the final luminous components of the galaxy, namely the disk and, in some cases, a bulge and central point. Both slow and fast growth of the luminous components are considered. Relatively flat rotation curves are easily obtained for reasonable values of the free parameters. The velocity distribution of dark matter particles in a reference frame rotating slowly about the galaxy center in the plane of the disk is similar to a Maxwellian, but it is somewhat boxier, being flatter at the peak and truncated in the tails of the distribution. We tabulate parameters for the best-fitting Maxwellian and modified-Maxwellian distributions. There is no significant difference between slow collapse and fast collapse for all these results. We were unable to detect any effect of disk formation on the z-dependence of the dark matter density distribution.

CO Observations of B133 and B134

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With the 14 m radio telescope at DRAO and 4 m at Nagoya University, we have made detailed maps of ^{12}CO and ^{13}CO emissions from two Barnard objects B 133 and B 134. Usual LTE analyses are

applied to determine the distribution of CO column densities. The total masses of B 133 and B 134 estimated from the column density maps are 90 $M_\odot$ and 20 $M_\odot$, respectively. While B 133 shows no systematic velocity gradient in any direction, B 134 shows velocity gradient along the NW to SE direction. This velocity gradient suggests either a fast rotation of the whole cloud or an orbital motion of sub-blobs. The radial velocity of B 133 is red shifted with respect to B 134 by 0.8 km/s, which is too large to bind the two globules as a binary system.

Stability Analysis of Barnard 133

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We have pointed out that the usual virial stability analysis based on only the sign of energy balance could be grossly misleading in judging whether a given cloud collapses or not. Once the observed total line width is separated into the components of turbulence and streaming motion, the time-dependent variations of the cloud radius R and its streaming velocity $\dot{R}$ can be followed up by the full version of scalar virial theorem with the moment of inertia term being included. As an example, we applied our method of stability analysis to the newly observed globule B 133. Results of the stability analysis suggest that the globule will eventually collapse in 2 to 4 million years.

우리 은하계의 진화 I

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시간 의존형 이중 초기 질량함수와 가스 밀도의 n 승에 비례하는 별의 생성률을 택하고, 원반과 헤일로에서 관측된 제한조건 (특히 중원소 함량의 누적 분포와 미분 분포, 주계열성의 현재 질량함수)을 이용하여 헤일로—원반 이중 모형의 진화를 조사했다.

헤일로의 형성 시간은 약 30억 년으로 이 동안에 대부분의 헤일로 별과 중원소 함량이 형성된다. 이 기간동안 은하 헤일로 질량의 95%가 원반으로 이동된다. 원반에서는 약 90억 년 이내에 별과 중원소 함량이 각각 80% 정도 형성되고, 과거 50억 년 동안 중원소 함량은 약 14% 증가되고 별의 생성률은 반 정도 감소된다. 원반 진화에서 초기($t < 1$Gyr)에 질량이 작은 별의 생성이 억제됨으로서 G형 왜성 문제가 해결되며, 나이—중원소 함량 관계와 나이—속도분산 관계는 관측과 잘 일치함을 보인다.