likelihood method is applied to get model parameters such as central potential, anisotropy radius, and total mass fractions in each mass class. This method can avoid problems in conventional binning method of chi-square. We utilize three velocity components, one from line of sight radial velocity and two from proper motion data. In our simplified scheme we adopt 3 mass-component model with unseen high mass stars, intermediate visible stars, and low mass dark remnants. Likelihood values are obtained for 124 stars in M13 for various model parameters. Our prefered model shows central potential of W_o = 7 and anisotropy radius with 7 core radius. And it suggests non-negligible amount of unseen high mass stars and considerable amount of dark remnants in M13.

우리은하의 적외선 모형 II

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적외선 천문위성 (IRAS)의 관측자료를 이용하여 12 μm 적외선원의 계수를 통하여 우리은하 전반에 걸친 이들의 분포를 얻고, 이를 맞추는 우리은하의 구조모형을 찾아냈다. 이 모형에서 우리은하는 두가지 구성 성분, 즉, 구형선분과 원반선분으로 이루어진 것으로 보았다.

IRAS의 관측과 지상관측을 통하여 확인된 장주기의 OH/IR 별의 광도함수 뿐만 아니라 Habing (1988)이 제시한 2원 종족 (two populations) 광도함수를 적용한 모형도 함께 검토하였다.

MAGNETIC CONFINEMENT OF THE OPTICAL JETS IN YOUNG STELLAR OBJECTS

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We discuss a model for collimating plasma outflow from a young stellar object via an axial current initiated by collisionally charged dust grains incorporated in the ionized outflow from the central object. The charged grains generate an electric current in response to their greater reaction to the radiation field of the central star and their large mobility with respect to the plasma. This produces a pinching toroidal magnetic field ~ 10^{-3} Gauss in the base flow. A simple self-similar, steady state MHD solution shows that a well collimated jet can result, when $\beta = C_s^2/V_A^2 \lesssim 1$ at the critical point in the flow, provided this pinch is only marginally overbalanced there by the gas pressure and centrifugal acceleration associated with any rotation of the jet.

VELOCITY INHOMOGENEITY OF THE COMA CLUSTER OF GALAXIES

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A velocity inhomogeneity, which is the regional preponderence of either radial or

tangential orbits, is searched with a new technique and very conspicuous inhomogeneities are found in the Coma cluster of galaxies. Nonparametic statistical tests indicate that the inhomogeneities are real at a 99% level of confidence. Even in the central regions (the annular zone of 7′ ~30′ from the center), zones that are dominated by radial orbits are clearly distinguishable from that of the tangential orbits, and defining the cluster 'equator' as the direction defined by Coma-A1367 supercluster, tangential orbits dominate the 'polar' zones. Galaxies located in 30′ ~100′ from the center also show significant inhomogeneity in that the polar zones are mostly radial and the velocities in the rest of zones are more or less homogeneous in distribution. These indicate that the orbits of Coma galaxies in global are exceedingly more radial, implying that there are significant infalls and is likely to be interpreted that Coma has gone through some sort of an earlier virialization particularly toward the equator.

Incorporating the velocity inhomogeneity into mass estimators, the most appropriate mass is inferred from tangential orbits, and this is turned out to be $0.4\times10^{15}\ h^{-1}M_{\odot}$ ($R\leq0.6\ h^{-1}$Mpc), and $1.0\times10^{15}\ h^{-1}M_{\odot}$ ($R\leq2.1\ h^{-1}$Mpc), and the corresponding mass to blue light ratio on the average is ~300h. These estimates are consistent with Merritt (1987) and Hughes (1989) and the M/L_B is seemed to favour the mass-follows-light models than the uniform spread of dark matter throughout the cluster.

Numerical Approach to Tidal Disruption of a Star by a Massive Black Hole I: Basic Scheme and Preliminary Results

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Tidal disruption of a star by a massive black hole is a well known phenomenon, but the evolution of the debris has not been well understood because of the complicated nature of hydrodynamical process. We have developed a computer program based on the Smoothed Particle Hydrodynamics (SPH) to investigate the dynamical evolution of the stellar debris. General relativistic precession is included using post-Newtonian approximation in order to minimize the complexity while no relativistic correction is made for hydrodynamic equations. No cooling is included except the thermal diffusion which effectively has the cooling effect in the region where temperature is much higher than surroundings. We found that about 50% of the material is unbound immediately after the disruption. The remaining particles move along the bound orbit with wide range of eccentricity. Because of large amounts of relativistic precession per orbit, the incoming stream of gas with longer periods intersects with outgoing stream of gas with shorter periods, resulting strong shocks. The gas particles gain large amount of random kinetic energy so that some fraction of shocked particles again becomes unbound. The preliminary results indicate that only a very small fraction of stellar mass eventually forms a outcome of stellar disruption largely depends on the fractional mass of circularized orbit as pointed out by Cannizzo, Lee, and Goodman