collapsing, the disk approaches LT solutions and stabilizes at Compton temperature.

An Upper Limit to the Electrodynamic Power Output From an Accretion Disk around a Black Hole

Seok Jae Park
Korea Astronomy Observatory

We examine the electrodynamic power output from an accretion disk surrounding a Kerr black hole. We derive an upper limit for the total power. We find that this limit is only moderately sensitive to most of the relativistic correction factors. In fact, this limit is less sensitive to the change in the black hole spin than one would expect from the change in the inner radius of the accretion disk. The disk around a rapidly rotating black hole will produce more nonthermal radiation than a similar disk around a slowly rotating black hole of identical mass, but the difference is only a factor of ~ 1.7.

Globular Clusters in Dwarf Galaxies and the Formation of Nucleated Dwarf Galaxies

K. S. Oh[1], G. Quinlan[2] and D.N.C. Lin[3]
[1]Department of Astronomy and Space Science, Chungnam National University
[2]Board of Studies in Astronomy and Astrophysics, University of California, USA

We try to examine dynamical reasons which could lead formation of nucleated dwarfs and non-nucleated dwarfs. We focus on the fact that many dwarf spheroidals have globular clusters. Despite that dynamical friction is important and effective for globular clusters' orbital decay in dwarf spheroidal galaxy, the outcome of dynamical evolution may depend on the differences between the internal velocity dispersion of the clusters and that of the host galaxies. As the clusters sink to the center of a host galaxy, they eventually interact with each other. The recoil velocity of cluster-cluster scattering may be comparable to the internal velocity dispersion of the clusters. If the recoil velocity is large compared with the velocity dispersion of the host galaxy, the clusters may be slingshot out of the core as in the case of Fornax. If the recoil velocity velocity is small compared with the velocity dispersion of the host galaxy, the cluster remains in the center of the host galaxy. Repeated encounters provide opportunities for the clusters to eventually coagulated. In order to study this dynamical process, we adopt a restricted N-body numerical scheme based on Aarseth's NBODY1 scheme. Although we adopt a point mass potential for the field stars, the gravitational potential parameter. Out preliminaryresults suggest that

nucleated dwarfs can be made from coagulation of globular clusters near central region.

Leo I, the Mass of Our Galaxy, and Dark Halo

Myung Gyoon Lee
Department of Astronomy, Seoul National University

Leo I is a dwarf spheroidal galaxy discovered in 1950 during the course of the first Palomar sky survey (harrington and Wilson 1950, PASP, 62, 118). It has been considered to be the most distant satellite galaxy bound to the our galaxy (Zaritsky et al. 1989, ApJ, 345, 759). Therefore accurate distance and velocity determinations are important for estimates of the mass of the our Galaxy using the timing arguments (Kahn and Woltjer 1959, ApJ, 130, 705).

Very recently the accurate distance to Leo I based on the tip of the red giant branch was given by Lee et al. (1993, AJ, in press), to be 270+10 kpc. With this distance estimate and the velocity data for Leo I (vGC = 177 km s-1) given by Zaritsky et al., we estimate the mass of the our Galaxy using the timing argument for the pair of the our Galaxy and Leo I: MG = 1.7 X 1012 M for an assumed age of the Universe of t = 14 Gyrs. The mass of the Local Group based on the pair of the our Galaxy and M31 is obtained in the same way: MLG = 4.4 X 1012 M (for distance(M31) = 770 kpc and v(M31) = -115 km s-1). This result is inconsistent with the conservative minimal halo model of the our Galaxy, but indicates an extended dark halo (Fich and Tremaine 1991, ARAA, 29, 409).

Interestingly a significant fraction-perhaps most-of the stellar population in Leo I appears to be only a few Gyrs old. It is puzzling how Leo I could form such stars out there. However, this kind of stellar population may not be rare, but very common in the Universe (for example, see the large number of faint blue galaxies in the field (Koo and Kron 1992, ARAA, 30, 613)).