[구GC-15] Dynamical Evolution of the Mass Function and Radial Profile of the Globular Cluster Systems of the Milky Way and M87

Jihye Shin[1], Sungsoo S. Kim[1], Myung Gyoon Lee[2], Narae Hwang[2], & Koji Takahashi[3]
[1]Kyung Hee University, [2]Seould National University, [3]Saitama Institute of Technology, Japan

Evolution of the mass function (MF) and radial distribution (RD) of the globular cluster (GC) systems of the Milky Way and M87 are calculated using an advanced and realistic Fokker-Planck (FP) model that considers dynamical friction, disk/bulge shocks, and eccentric cluster orbits. We perform hundreds of FP calculations with different initial cluster conditions, and then search a wide parameter space for the best-fit initial GC MF and RD that evolves into the observed present-day GC MF and RD. By allowing both MF and RD of the initial GC system to vary, we find that our best-fit models have a higher peak mass for a log-normal initial MF and a higher cutoff mass for a powerlaw initial MF than previous estimates. We discuss the possibility of using the peak mass of the GCMF in a galaxy as a standard candle.

[구GC-16] Dynamical Evolution of Self-gravitating Gaseous Disks in Barred Galaxies

Doo-Su Yoon, Woong-Tae Kim
Department of Physics and Astronomy, Seoul National University, KOREA

Barred galaxies provide information on the physical processes that drive a large amountof gas toward galactic nuclei and induce nuclear star formation. In the presence of the two inner Lindblad resonances, the inflowing gas forms a high-density, low-shear nuclear ring in between those radii, which was thought of as being the sites of active star formation. Using grid-based numerical hydrodynamic simulations, we have investigated the dynamicsof gas inflow, formation of a nuclear ring, and its subsequent gravitational instability in barred galaxies. We consider an infinitesimally-thin, gaseous disk subject to an external bar potential. The gas is assumed to be isothermal and unmagnetized. To achieve high resolution near the central parts, we set up polar coordinates with logarithmically-spaced radial gridsand solve the gaseous self-gravity using the Miller scheme. The bar potential rapidly induces a pair of dust lanes and a nuclear ring. The dust lanes, offset toward the leading edge of the bar, tend to move toward the bar major axis as the sound speed increases, resulting in a smaller ring that forms at the inner end of the dust lanes. When the ring achieves high enough density, it fragments via gravitational instability into a number of high-density condensations, potentially responsible for active star formation observed in nuclear starburst galaxies. On the other hand, the dust lanes and the bar-end regions that were previously thought vulnerable to gravitational instability are found to be highly stable because of strong shear.