[구GC-05] Distribution of Baryonic Matter in Dark Matter Halos: Effect of Dynamical Friction

Yeong-bok Bae, Hyung Mok Lee
Department of Physics and Astronomy, Seoul National University

We studied the evolution of the two mass components system with NFW initial density distribution by direct integration of the Fokker-Planck equations. The low mass component is regarded the dark matter particles while the high mass component is assumed to be conglomerates of baryonic matter in order to depict the 'stars'. While the true mass ratio between these two types of particles should be extremely large, our adopted mass ratio is about 1000 beyond which the dynamical evolution and density distribution tend to converge. Since the dynamical evolution is dominated by the dynamical friction, the high mass component slowly moves toward the central part, and eventually undergoes the core collapse. The system reaches the core-collapse at about 7.1×10^{-3} t_{fh} in NFW models, where t_{fh} is the dynamical friction time at half-mass radius. The distribution of the high mass component is well fitted by the Sersic profiles or modified Hubble profile when the mass segregation is established. From these results, the surface brightness of elliptical galaxies may be explained by the high mass component experiencing dynamical friction by the dark matter particles. In order for the mass segregation to be effective within Hubble time, the mass of the luminous component should be greater than $10^5 M_\odot$.

[구GC-06] Gravitational Wave Emission from Pulsars with Glitches

Jinho Kim, Hyung Mok Lee
Department of Physics and Astronomy, FPRD, Seoul National University, Seoul 151-742, Korea

Gravitational waves from the pulsar glitch can be detected by next generation gravitational wave observatories. We investigate characteristics of the modes that can emit the gravitational waves excited by three different types of perturbations satisfying conservation of total rest mass and angular momentum. These perturbations mimic the pulsar glitch theories i.e., change of moment of inertia due to the star quakes or angular momentum transfer by vortex unpinning at crust-core interface. We carry out numerical hydrodynamic simulations using the pseudo-Newtonian method which makes weak field approximation for the dynamics, but taking all forms of energies into account to compute the Newtonian potential. Unlike other works, we found that the first and second strongest modes that give gravitational waves are ${}^2p_1$ and H_1 rather than ${}^2f$. We also found that vortex unpinning model excites the inertial mode in quadrupole moment quite effectively. The inertial mode may evolve into the non-axisymmetric r-mode.