[구CD-09] Modification of a cosmological hydrodynamic code for more realistic baryonic physics

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We aim to investigate the formation of globular clusters (GCs) in hierarchical structure of matters of Lambda cold dark matter (CDM) cosmology on detailed numerical simulations. To accomplish our research goal, we have added the following baryonic physics on the existing cosmological hydrodynamic code, Gadget-2: 1) radiative heating and cooling, 2) reionization of the Universe and UV shielding, 3) star formation, 4) energy and metallicity feedback by supernova. In addition, we included cluster formation to distinguish clustered star formation inside the very high density gas clumps from the field star formation. Our simulations cover a cubic box of a side length 4Mpc/h with 130 million particles. The mass of each particles is 3.4×104Msun, thus the GCs can be resolved with more than hundreds particles. We discuss various properties of the GCs such as mass function, specific frequency, baryon-to-dark matter ratio, metallicity, spatial distribution, and orbit eccentricity distribution as functions of redshift. We also discuss how the formation and evolution of the GCs are affected by UV shielding.

[구CD-10] Testing Gravitational Weak-lensing Maps with Galaxy Redshift Surveys: preliminary results

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To measure the mass distribution of galaxy systems weak-lensing analysis has been widely used because it directly measures the total mass of a system regardless of its baryon content and dynamical state. However, the weak-lensing only provides a map of projected surface mass density. On the other hand, galaxy redshift surveys provide a map of the three-dimensional galaxy distribution. It thus can resolve the structures along the line of sight projected in the weak-lensing map. Therefore, the comparison of structures identified in the weak-lensing maps and in the redshift surveys is an important test of the issues limiting applications of weak-lensing to the identification of galaxy clusters. Geller et al. (2010) and Kurtz et al. (2012) compared massive clusters identified in a dense redshift survey with significant weak-lensing map convergence peaks. Both assessments of the efficiency of weak-lensing map for cluster identification did not draw a general conclusion, because the sample is so small. Thus, we additionally perform deep imaging observations of fields in a dense galaxy redshift survey that contain galaxy clusters at $z\sim0.2-0.5$, using CFHT Megacam.