[구GC-07] On the evolution of observable properties from equal-mass disk merger simulations

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We use numerical simulations to investigate the evolution of both the star formation rate (SFR) and the observable properties of equal-mass disk merger remnants for 18 different orbital configurations. In our analysis, the photometric properties of the remnants have been constructed by considering dust reddening effect in order to facilitate the comparison with observational data of large surveys such as the Sloan Digital Sky Survey (SDSS). First, we found that the detailed evolutions of merging galaxies are different between the merging characteristics such as merging time scale, SFR history, and burst efficiency. Around 70 $\pm$ 5 percent of gas turns into stars until the merger-induced starburst ends regardless of merger types. Our study also suggests that merger features involve a small fraction of stars. Merger features last roughly 3 times the final coalescence time of galaxy mergers. For a shallower surface brightness limit, the features seem to survive in a shorter time, which is the reason why detecting merger features by using shallow surveys were difficult in the past.

[구GC-08] Large-Scale Environmental Effects on the Mass Assembly of Dark Matter Halos

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We examine large-scale environmental effects on the formation and the mass growth of dark matter halos. To facilitate this, we constructed dark matter halo merger trees from a cosmological N-body simulation, which enabled us to trace the merger information and the assembly history of individual halos. In fact, since the massive halos are more likely to be distributed in denser regions than in less dense regions (Mo & White, 1996), the large-scale environment dependence of the properties of halos can be partly originated from the halo mass effect. In order to avoid such contamination, caused by the mass dependence of halo properties, we carefully measured the local overdensity as the indicator of large-scale environment, which was calculated to be as independent of halo mass as possible. Small halos (~ $10^{11-12} M_{\odot}$), which usually host isolated single galaxies, show a notable difference on the formation time of galaxies depending on their large-scale environments, which reconfirms *halo assembly bias* (Gao & White, 2007). Furthermore, we investigate how this environmental effect on small halos is correlated with the mass assembly history of galaxies by using our semi-analytic model. We found that *assembly bias* in small halos does not have significant effects on the formation time or on the star formation history of galaxies residing in those halos except for the individual stellar mass of galaxies at z = 0. On average, isolated galaxies in high-density regions tend to be slightly more massive than those in low-density regions. Although the observational data from the current galaxy surveys is not yet sufficient for testing this prediction, future galaxy surveys will be able to explore these small galaxies more thoroughly.