[박ST-10] Observational Evidence of Merging and Accretion in the Milky Way Galaxy from the Spatial Distribution of Stars in Globular Clusters

Sang-Hyun Chun
Department of Astronomy, Yonsei University, Seoul, Korea

The current hierarchical model of galaxy formation predicts that galaxy halos contain merger relics in the form of long stellar streams. In order to find stellar substructures in galaxy, we focused our investigation on the stellar spatial density around globular clusters and on the quantitative properties of the evolved sequences in the color-magnitude diagrams (CMDs). First, we investigated the spatial configuration of stars around five metal-poor globular clusters in halo region (M15, M30, M53, NGC 5053, and NGC 5466) and one metal-poor globular cluster in bulge region (NGC 6626). Our findings indicate that all of these globular clusters show strong evidence of extratidal features in the form of extended tidal tails around the clusters. The orientations of the extratidal features show the signatures of tidal tails tracing the clusters' orbits and the effects of dynamical interactions with the galaxy. These features were also confirmed by the radial surface density profiles and azimuthal number density profiles. Our results suggest that these six globular clusters are potentially associated with the satellite galaxies merged into the Milky Way. Second, we derived the morphological parameters of the red giant branch (RGB) from the near-infrared CMDs of 12 metal-poor globular clusters in the Galactic bulge. The photometric RGB shape indices such as colors at fixed magnitudes, magnitudes at fixed colors, and the RGB slope were measured for each cluster. The magnitudes of the RGB bump and tip were also estimated. The derived RGB parameters were used to examine the overall behavior of the RGB morphology as a function of cluster metallicity. The behavior of the RGB shape parameters was also compared with the previous observational calibration relation and theoretical predictions of the Yonsei-Yale isochrones. Our results of studies for stellar spatial distribution around globular clusters and the morphological properties of RGB stars in globular clusters could add further observational evidence of merging scenario of galaxy formation.