[P-047/GC-3] Yonsei Evolutionary Population Synthesis (YEPS): Effects of Super-Helium-Rich Populations

Chul Chung, Young-Wook Lee, and Suk-Jin Yoon
Department of Astronomy, Yonsei University, Seoul, South Korea

The recent discoveries of multiple stellar populations in massive Milky Way globular clusters (GCs) have provided the evidence that Helium abundance anomalies are primordial in the GCs. In order to keep pace with the recent discoveries, we have constructed enhanced Helium abundance Yonsei Evolutionary Population Synthesis (YEPS) model based on most up-to-date Yonsei-Yale stellar evolution tracks. We present integrated spectro-photometric quantities of enhanced He abundance populations with special care in dealing with the morphologies of horizontal branch stars (HBs) with respect to metallicity, age & Helium contents. Our new models provide completely new insights not only on the strong FUV flux of extra galactic GCs but also on the enhanced Balmer-lines of local and intermediate redshift early type galaxies.

[P-048/GC-4] A Crucial Test for (Non-)Existence of Two Distinct Subpopulations of Globular Clusters: Their Radial Number Profiles in Elliptical Galaxies

Sang-Yoon Lee, Suk-Jin Yoon, and Chul Chung
Department of Astronomy & Center for Space Astrophysics, Yonsei University, Korea

The colors of globular clusters (GCs) in most large early-type galaxies are bimodal, and the two GC groups show sharp difference in their radial profiles of the surface number density. An instant solution is to assume the presence of two distinct GC sub-systems with different radial distributions. The scenario however has been challenged by Yoon, Yi, & Lee (2006), who propose that, due to the non-linear nature of the metallicity-to-color transformation, a coeval group of old clusters with a unimodal metallicity spread can exhibit color bimodality. Applying this hypothesis to the radial GC color variation of several giant elliptical galaxies, we find that the different radial number density profiles between the two GC groups can be a natural consequence of the observed higher mean metallicity of GCs towards the galaxy center. Interestingly, we detect no or little variation in GC age along the radius out to ~20 effective radius, indicating that the radial color distribution change is mainly governed by the variation in mean metallicity. This implies that most GCs formed rapidly throughout the entire galaxy. Our results provide a simpler solution to the radial variation of GC color distributions that does not necessarily invoke distinct GC sub-systems, and further support Yoon et al.'s hypothesis.