

[초GC-01] Life of the Milky Way Galaxy

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I will report recent progress in understanding properties of stellar and interstellar components of the Milky Way Galaxy on the two extremes — ongoing star formation activities in the Galactic center and stellar relics in the halo. Properties of the interstellar medium in the Galactic center and their relationship with star formation activities will be discussed based on by far the largest mid-IR spectroscopic data set in this region. Correlations between stellar kinematics and metallicities in the halo will be presented, along with a discussion on the estimation of fundamental stellar parameters from a set of empirically calibrated isochrones.

[박GC-02] Yonsei Evolutionary Population Synthesis for Old Stellar Systems

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We present the Yonsei Evolutionary Population Synthesis (YEPS) models for spectroscopic and photometric evolutions of simple and composite stellar populations. The models are based on the most up-to-date Yonsei-Yale stellar evolutionary tracks and BaSel 3.1 flux libraries, and provide integrated spectroscopic quantities of Lick/IDS system including high-order Balmer absorption-lines. Special care has been taken to incorporate the systematic variation of horizontal branch (HB) morphology as functions of metallicity, age, alpha-element mixture, and helium abundance of simple stellar populations. Our models for normal-helium stellar populations indicate that the realistic modeling of HB and alpha-element brings about 5 Gyr and 0.1 dex differences in age and metallicity estimations, respectively, compared to those without these effects. The HB effect does not depend on the specific choice of stellar libraries and alpha-element enhancements, and this effect is non-negligible even in the metal sensitive absorption indices, such as Mg2 and Mg b. Comparison of the models to observations reveals that the HB and alpha-element effects are critical in understanding otherwise inexplicable phenomena found in globular cluster systems in the Milky Way and nearby galaxies, including the observed bimodality of the line strengths of globular clusters in massive galaxies. In addition, we found that helium-enhanced stellar populations, which are the major sources of extreme HB stars, bring about increased FUV, NUV fluxes, and thus the model colors of those filters become extremely blue. Age dating based on the YEPS model with normal-helium stellar populations reveals that the evidence for 'downsizing' of elliptical galaxies is found not only in the local field but also in Coma cluster, and that the mean age of elliptical galaxies in Coma cluster is about 1.4 Gyr younger than the mean age of those in the local field. We also find that our models with helium-enhanced subpopulations can naturally reproduce the strong UV-upturns observed in giant elliptical galaxies assuming an age similar to that of old GCs in the Milky Way.