[구ST-11] Yonsei Evolutionary Population Synthesis

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We present a new version of the Yonsei Evolutionary Population Synthesis (YEPS) model for simple stellar population based on the most up-to-date Yonsei-Yale stellar evolutionary tracks. We have modeled the integrated spectro-photometric quantities such as the absorption-line features and magnitudes in various passbands. Great care has been taken to incorporate the systematic variation of horizontal-branch morphology with respect to metallicity, age, helium contents, and alpha-element abundance. Comparison of the model to observations reveals that the HB effect is a key element in understanding otherwise inexplicable phenomena found in globular cluster (GC) systems in the Galaxy and external galaxies. Wide application of the YEPS model will be discussed with a particular interest in interpreting (a) GC color bimodality found in bright galaxies, (b) the Balmer-line-enhanced GCs possibly due to super-He-rich subpopulation, and (c) the galaxies with enhanced Balmer lines in the local universe.

[구ST-12] Chemical abundances of eclipsing binaries: software and methodic

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We have developed the software to find detailed chemical compositions of eclipsing binaries as well as single stars based on the Kurucz's programs. The abundance analysis requires the computation of synthetic spectra, line identification, selection of unblended lines, continuum placement, measurement of equivalent width, and line analysis. These steps are necessary after extracting the spectrum from the observation. For the purpose of convenience, we made several utility programs such as selecting model atmosphere, changing format of model atmosphere, running program iteratively in 50 Å units, saving the output in 50 Å units, changing output file names, sorting the outputs, etc. Then we merged our utility programs and the Kurucz's SYNTHE which calculates synthetic spectra.

We made two more programs for automatic selection of the unblended lines using the line data of the synthetic spectra calculation and for continuum placement by comparing with synthetic spectrum. We added the possibility of calculating of abundances in stratified stellar atmospheres and the influence of non-radial pulsations on stellar spectra to SYNTHE and WINDTH9. The last one is the program for abundance analysis from the equivalent width of observed lines.

Then WIDTH9 was merged with the utility programs for selecting line lists for taking atomic data, changing format, and for graphics.

Finally we found the chemical compositions of several eclipsing binary systems derived using the merged software.