New Spectral Templates of Galaxies for Multi Color Classification

I. Franco[1], K. Meisenheimer[1], C. Wolf[2], E. Bell[1], M. H. Nicol[1], and C. Tapken[1]

[1]Max-Planck Institut für Astronomie, Königstuhl 17, 69117 Heidelberg, Germany
email:franco@mpia-hd.mpg.de

[2]Department of Physics, Denys Wilkinson Bldg.,University of Oxford,
Keble Road, Oxford, OX1 3RH, UK

Abstract. Observations in the Chandra Deep Field South (CDFS) have provided us with a useful set of data in the optical ($COMBO-17$), near-infrared (GOODS JHK), and mid-infrared (GOODS IRAC bands $1, 2$) wavelength regimes to test and improve a new spectral galaxy template library, designed to operate in the rest-frame wavelength range between 0.1 and 5 microns. In this range the stellar continuum and emission lines from HII regions dominate the Spectral Energy Distribution (SED) of galaxies. The new library is based on a self-consistent two-burst model, that has been developed in order to reproduce the star formation histories of different types of galaxies more accurately than single-burst histories and thus provides a better match to real galaxy spectra, as well as more reliable mass-to-light ratios. The spectral library is built by using a population synthesis code (PEGASE) assuming a Kroupa (2003) initial mass function. An old burst of exponentially decaying star formation with an initial metallicity of 0.1 solar is followed by a very recent (60 Myr old) second burst in order to reproduce the spectra of actively star forming blue galaxies. In addition, the templates include dust extinction of various strengths. For the multi-color classification the spectral library is red-shifted between $z = 0$ and $z = 2.5$ and converted into the 21 colors which have been observed by $COMBO-17$ plus its near- and mid-infrared extensions provided by the public GOODS data.

Keywords. surveys, galaxies: evolution, galaxies: spectral galaxy templates.

References

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