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COMBO-17+4: An Optical-NIR Survey for Galaxies out to z=2

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Abstract. Classifying Object by Medium-Band Observations in 17 filters (COMBO-17) has already produced a very accurate picture of galaxy evolution since z∼1 based on 25000 galaxies in 17 medium optical bands. We now extend the range of reliable multi-color redshifts with COMBO-17+4, a deep optical-NIR survey which will combine the existing optical data set of COMBO-17 with near infrared observation in three medium bands : Y($\lambda/\Delta\lambda = 1040/80$nm), J1(1190/130nm) and J2(1320/130nm) and one broad band H(1650/300nm). The NIR bands extend the photometric redshift range to z∼2.1. COMBO 17+4 will provide the first large sample of galaxies (>5000) at 1<z<2 with a redshifts accuracy of Δz<0.03(1+z). Three fields are observed: Abell 901, Abell 226 and the COMBO 11h-field, for a total coverage of 0.77$\square^2$ of the sky. Each COMBO 17+4 field measures 31 × 30 sqarcmin. The NIR bands are observed with the Omega2000 camera at Calar Alto Observatory in Spain.

The scientific goals for this study are multiple. COMBO-17+4 will enable us to establish the luminosity function for the red sequence and blue galaxies in the redshift range 1<z<2. Also it will be possible to determine the formation history at z=2 by analyzing the width of the red sequence galaxies. Moreover this survey will provide several thousand of individual galaxy masses (with an accuracy <30%) obtained with Spectral Energy Distribution (SED) template fitting. Once the masses are obtained the mass function will provide a useful tool to test the hierarchical model of evolution of galaxies by checking whether the massive red sequence galaxies (logM>10.5) are already in place at z>1.5 (9Gyr).

We present first results from the full 21 bands photometry in half of the Abell 901 field. It allows us to study not only z>1 galaxies but also the stellar content of several hundred cluster galaxies.

Keywords. surveys, galaxies: evolution, galaxies: photometry.

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