

HII regions evolution: by using POPSTAR evolutionary synthesis models

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Abstract

We show the results from a series of papers where we present the POPSTAR evolutionary synthesis models. The ionizing Spectral Energy Distributions (SEDs) are those obtained by the POPSTAR code (Mollá et al. 2009, MNRAS, 398, 451) for 6 different metallicities, with a very low metallicity set, $Z = 0.0001$, not included in previous similar works. We compute the synthetic emission line spectra of HII regions ionized by young star clusters by combining the cluster SEDs with the photoionization code CLOUDY, for 7 values of the cluster mass and ages ranging between 0.1 and 5.2 Myr (Martín-Manjón et al. 2010, MNRAS, 403, 2012). We assume that the radius of each HII region is the distance at which the ionized gas is deposited by the action of the mechanical energy of massive star winds and supernovae from the central ionizing young cluster. This allows us to eliminate the ionization parameter u as a free argument, since now its value is set from the cluster physical properties (mass, age and metallicity) and from the chemical gas properties (hydrogen density and abundances). Finally we calculate the contribution of these emission lines to the broad band colors (García-Vargas et al. 2010, in prep.). The color-color diagram are strongly affected, and consequently the interpretation of stellar properties from photometrical observations. All products are available in the VO, in the VizieR On-line Data Catalog: J/MNRAS/398/451 and in the FRACTAL web page (<http://www.fractal-es.com>).

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