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AGE DETERMINATION OF GALACTIC HII REGIONS

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ABSTRACT. $[OIII]/H_\beta$ and WH_β were measured photoelectrically in 29 galactic HII regions with $7^h:30^m < \alpha < 13^h$. The ages of these nebulae were estimated from the HII region evolutive models of Copetti et al. (1984).

I. INTRODUCTION

In a previous paper (Copetti et al., 1984) the behavior of the properties WH_β (the equivalent width of the H_β emission line) and $[OIII]/H_\beta$ (the ratio of the intensity of the [OIII] $\lambda\lambda$4959, 5007 lines to H_β) were studied as a function of the evolution of an HII region through models which took into account: a burst for the formation of the ionizing association; different initial mass function IMF; upper stellar mass limit Mu between 30 and 120 $M_\odot$; models of stellar evolution with and without mass loss. It was found that WH_β and $[OIII]/H_\beta$ decrease monotonically as a function of the time and were consequently good HII region age indicators.

Here, these models are compared with measurements of WH_β and $[OIII]/H_\beta$ for galactic HII regions in order to estimate their ages.

II. THE OBSERVATIONS

$[OIII]/H_\beta$ and WH_β were measured photoelectrically in 29 galactic HII regions with right ascension between $7^h:30^m$ and 13^h. The observations were obtained in 1984 february at Cerro Tololo Inter-American Observatory with the 60 cm telescope. The interference filters used were: the H_β narrow, with passband $\Delta\lambda$ = 30 Å; the H_β wide, with $\Delta\lambda$ = 150 Å; the [OIII] centered at 5000 Å and with $\Delta\lambda$ = 70 Å. The measurements were calibrated through spectrophotometric standard stars (Oke, 1974). From the RCW catalogue of galactic emission nebulae (Rodgers et al., 1960) those HII regions with diameter $\emptyset$ < 4' were selected,

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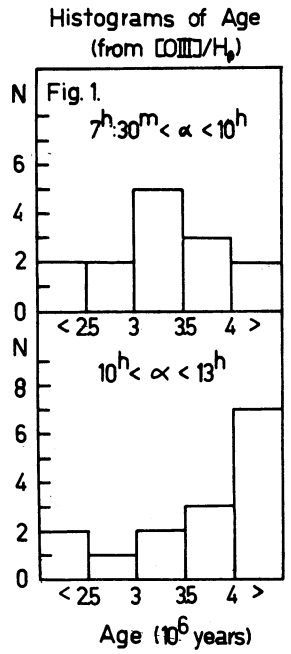

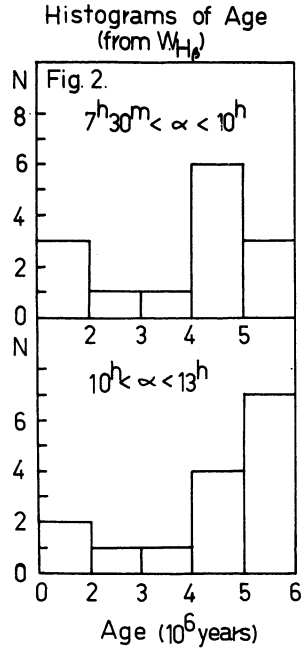

which allowed the global observation of the objects.

III. CONCLUSIONS

The measurements of WH_β and $[OIII]/H_\beta$ of the 29 galactic HII regions were analysed using the models of Copetti et al., (1984). The observed HII regions were divided into two groups: $7^h:30^m < \alpha < 10^h$ and $10^h < \alpha < 13^h$. The figures 1 and 2 show the histograms of ages obtained from the $[OIII]/H_\beta$ and WH_β values, respectively. The HII regions within the interval $7^h:30^m < \alpha < 10^h$ seem to be generally younger than those within $10^h < \alpha < 13^h$.

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