

PLANETARY NEBULAE AND THE PREGALACTIC HELIUM ABUNDANCE

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Recent work has emphasized the determination of the pregalactic helium abundance by mass Y_p and the slope $\Delta Y/\Delta Z$ based on the chemical composition of both galactic and extragalactic H II regions (Pagel, 1987; Pagel et al., 1986).

On the other hand, planetary nebulae (PN) can also be used to estimate these quantities (Peimbert, 1983; 1986), when account is taken of the different types that comprise the galactic PN. In fact, it has been recently shown that type II PN have chemical and kinematical properties closely resembling those of galactic H II regions (Maciel and Faúndez-Abans, 1985; Faúndez-Abans and Maciel, 1986; Maciel, 1987). Moreover, on the basis of nitrogen abundance and gradients of heavy-elements, it has been suggested that type II PN include two different subtypes, namely type IIa and IIb (Faúndez-Abans and Maciel, 1987), the latter showing the smallest heavy-element enrichment of all PN.

In the present work, type IIb PN are used to determine Y_p and the slope $\Delta Y/\Delta Z$. It is shown that the planetary nebulae alone imply an upper limit to the pregalactic abundance. The combination of the PN with galactic and extragalactic H II regions produces a good correlation between the helium abundance and the metallicity, from which it can be deduced that $Y_p = 0.234 \pm 0.004$, and $\Delta Y/\Delta Z = 3.5 \pm 0.3$, in good agreement with recent determinations based on H II regions and blue compact galaxies. (Work supported by CNPq-Brasil).

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