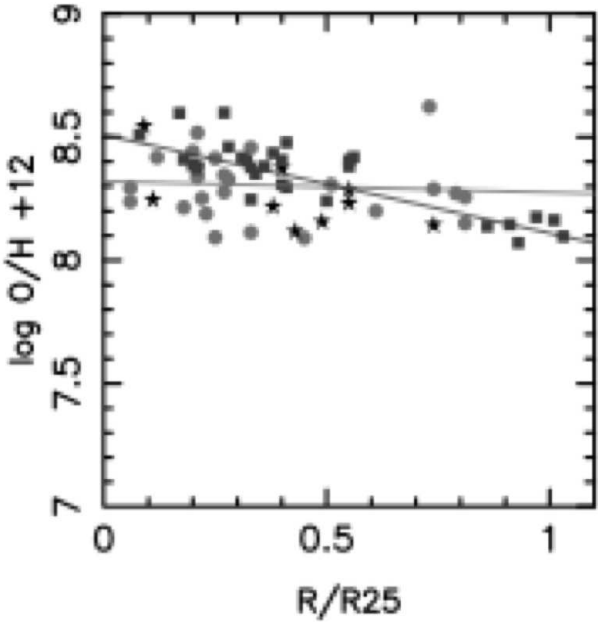

Fig. 1. O/H abundances vs. galactocentric distance for HII regions (filled squares) and PNe (filled circles). The stars correspond to a few compact HII regions. The gradient of O is clear for HII regions (black filled squares), and it is flatter and more disperse for PNe (gray filled circles). Stars represent compact HII regions.

regions and the HII regions analyzed by Bresolin et al. (2009), we have found that, in NGC 300:

1.- PNe and HII regions present a similar range of O/H abundance ratios, with 12+log O/H in the range from about 8.1 to 8.6.

2.- PNe show higher ionization degree (as given by the O^{++}/O^{+} ionic abundance ratios), and higher [O III] electron temperatures and densities, than HII regions.

3.- PNe have lower total Hβ luminosities than HII regions.

Regarding the chemical abundances, PNe present much higher N/O abundance ratio than HII regions (which is expected as LIMS contaminate their atmospheres with nucleosynthesis products, mainly He, N and C) and, unexpectedly, our PN sample seems to have slightly larger Ne/O ratios. This latter could be partially, the effect the ON-cycle operating in the most massive PN central stars, which converts O into N (most probably, we are detecting mainly the most massive and bright PNe). In addition, a possible problem with the ionization correction factor for Ne could be originating this behavior. Other elemental ratios, such as Ar/O and S/O, do not show this problem and are similar in both type of nebulae.

2.2. *Abundance gradients*

We analyzed the possible existence of abundance gradients in the disk of the galaxy. Galactocentric deprojected distances of PNe were calculated in the same way as for HII regions, by assuming R_{25} (the radius at which the surface brightness equals 25 $mag_B/arcsec^2$) equal to 5.33 kpc and an inclination of 39.8 degrees for NGC 300 (Bresolin et al. 2009). Figure 1 shows the behavior of O/H abundance ratio with the galactocentric distance (given in units of R_{25}) for HII regions and PNe. A clear gradient appears for HII regions (already reported by Bresolin et al. 2009) and also a gradient exists for PNe, although it is flatter and less defined. Near the center, PNe seem to have, in average, lower O/H abundance ratios than HII regions. This is not the case in the periphery, where PNe show similar or slightly higher O/H than HII regions.

The lack of a clear O abundance gradient for PNe could be attributable to a mixture of phenomena. In first place, O in PNe could not be representing the original value when the central star was formed as it is known that, in more massive central stars some O depletion can occur during the ON-cycle, or alternatively, in low-metallicity central stars, O can be dredged up during the 3rd. dredge up event (e.g., Peña et al. 2007). This could be affecting the most massive central stars. On the other hand, PNe are a mixture of stellar populations, with ages ranging from several to a few Gigayears, thus, due to the chemical evolution of the interstellar medium in the galaxy, the older PNe were formed in a less enriched ISM than the young PNe, affecting any possible gradient. Besides, older PNe could have migrated from their original position in the galaxy, to a smaller or larger galactocentric distance, affecting then a possible gradient. In this respect, it will be interesting to analyze the behavior of other elements such as Ne, Ar and S.

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