

Chemical Abundances of Planetary Nebulae Towards the Galactic Anticenter

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Abstract. We report the results of spectrophotometric determinations of chemical abundances for a planetary nebulae sample located outside the solar circle, with galactocentric distances between 8 and 14 kpc. Our results show a decreasing gradient for $R > 10$ kpc and a possible dependence of the gradient with the age of the progenitors (Work supported by FAPESP).

1. Introduction

There is a well established gradient of chemical abundances on the galactic disk, detected in the solar neighbourhood. Abundances derived from planetary nebulae can play an important role in the description of this scenario, as they can be derived accurately even large distances. From the edge of the bulge to galactocentric distances around $R=10$ kpc a gradient in oxygen, argon and sulphur abundances is seen. However, for larger distances there are theoretical indications of a decreasing gradient, or even a flat distribution. Besides, observational data on chemical abundances are scarce for these distances.

2. Observational data

Spectra were measured using the ESO 1.52m telescope at La Silla/Chile, using the B&C spectrograph and a grating allowing a reciprocal dispersion of 2.2 Å/pixel. CCD#38 (Loral-Lesser) allowed a spectral coverage of about 5400 Å. Data reduction was performed using the IRAF package.

Ionic abundances were calculated through a three-level atom model and elemental abundances were derived using Ionization Correction Factors (icf) to account for unobserved ions. To increase the final sample, data from Costa et al. (1997) were included in the analysis.

3. Results and discussion

In spite of the radial gradient of abundances be well known in the solar neighbourhood (Maciel & Köppen 1994), its behaviour for large galactocentric distances is still uncertain. There are indications that it could decrease or even disappear for $R > 10$ kpc (Costa et al. 1997; Chiappini et al. 1997).

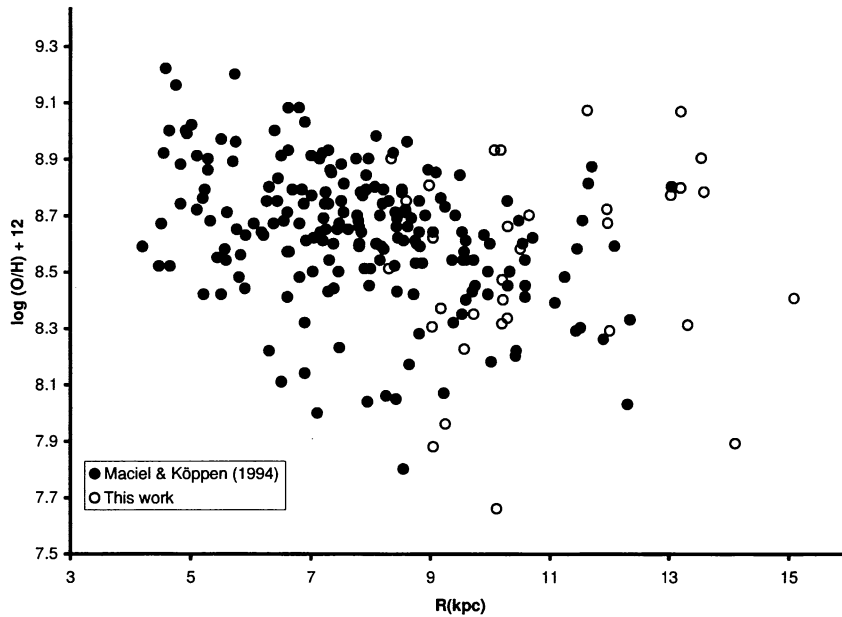


Figure 1. Data from the inner part of the disk combined with ours (see text). Results show the well known gradient in the solar neighbourhood, and a change in the slope around $R \sim 10$ kpc.

Figure 1 displays data from the inner disk (Maciel & Köppen 1994) combined with our results. Examining the figure, a change in the slope at $R \sim 10$ kpc can be seen. For the inner disk the gradient appears, but when one includes our data, which are mainly beyond $R \sim 10$ kpc the distribution points to a lower gradient or even a flattened distribution at larger galactocentric distances, which agrees with theoretical predictions from galactic evolution models.

Another interesting point that appears from our analysis, combining our data with those from Maciel and Köppen, is that the slope of the abundance gradient decreases from older to younger objects when they are divided in age groups. This is discussed in more details by Maciel & Costa (these proceedings).

References

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