

## The Chemical Abundances of Planetary Nebulae in Centaurus-A (NGC 5128)

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Abundances in early-type galaxies are measured from the analysis of stellar spectra (e.g. colour indices, Peletier et al, 1990). The presence of many planetary nebulae (PN) in early-type galaxies provides an independent measure of abundances for the old stellar population and allows the spread in abundances to be sampled at a range of galacto-centric distances. PN are feasible for this project since the nebular O, Ne and S abundances in most PN reflect that of the progenitor star.

We present spectroscopic studies, employing the ESO 3.6m + EFOSC1 ( $\lambda$  3600–7000Å, resolution of  $\approx 15\text{Å}$ ), of five of the brightest PN in Centaurus-A (NGC 5128) from Hui et al (1993). Exposure times were between 4 and 9 hours. One key aim was to determine whether or not the brightest PN are Type I PN or simply the brightest members of the PN (Type II) population.

From the  $H\alpha/H\beta$  ratios there is very little reddening towards the PN in this sample. The [O III]4363Å line is not measurable in any of the spectra. Values of  $T_e=10\,000\text{ K}$  and  $N_e=5000\text{ cm}^{-3}$  are assumed for the PN when calculating ionic abundances. PN 4001 has pronounced lines of [S II]6725Å and [N II]6585Å whilst PN5601 shows possible He II 4686 Å emission. Comparing with the two PN analysed in the Sagittarius Dwarf galaxy (Zijlstra et al, these proceedings), the Cen-A PN would appear to have more 'Galactic' type spectra — not to be metal poor as for the Sagittarius PN. The  $O^{2+}$  abundance is 8.7 for PN's 1902, 4001 and 5601 (logarithmic abundance,  $H=12$ , error  $\sim 0.25$  dex). Assuming that  $O^{2+}$  represents most of the O abundance, then this number agrees well with the O abundance of  $8.68 \pm 0.14$  found in Galactic PN (e.g. Aller & Czyzak, 1983)

The data show that limited abundance determinations of PN at the distance of Cen-A can be made with a 4-m class telescope and grism spectrograph combination. Spectrophotometry of 5 globular clusters in Cen-A by Jablonka et al (1996) suggests that the Fe/H abundances are around solar with no evidence for higher metallicity. This fits with the O/H determination from the PN and suggests that Cen-A has an approximately Galactic metallicity. This may lend some support to the notion that ellipticals are the result of conglomerations of spirals.

### REFERENCES

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