PLANETARY NEBULAE: THEIR EVOLUTION AND ROLE IN THE UNIVERSE
IAU Symposium, Vol. 209, 2003
S. Kwok, M. Dopita, and R. Sutherland, eds.

Studies of the Planetary Nebulae in NGC 5128

J. R. Walsh
ST-ECF, ESO, Karl-Schwarzschild Strasse 2 , D-85748 Garching, Germany

G. H. Jacoby
KPNO, P.O. Box 26732, Tucson, AZ 85726, USA

R. F. Peletier
Department of Physics & Astronomy, University of Nottingham, University Park, Nottingham NG7 2RD, UK

N. A. Walton
Institute of Astronomy, University of Cambridge, Madingley Road, Cambridge, CB3 OHA, UK

As the nearest large elliptical galaxy, NGC 5128 is ideal for planetary nebula studies. Its size, favourable aspect, small distance and reddening allow low mass stellar evolution in a whole galaxy to be surveyed. The surface density and properties of the PN can be compared with stars of various ages, metallicities and components (bulge, halo). The PN provide the α-element abundances whilst stellar photometry is calibrated against Fe/H; applied to the same stellar population, the PN abundances can be related to those of the stars. Gradients and non-radial trends in the abundance can be mapped using spectral observations of a large number of PN, allowing star formation history to be studied.

An imaging and spectrometry programme devoted to NGC 5128 is underway. The imaging aspect aims to obtain a complete, magnitude-limited sample of PN in NGC 5128. Preliminary ESO Wide Field Imager (WFI) data in the [O III] filter (0.8 square degrees) has been analysed to detect all PN to m_{5007A} = 25.5 (i.e. 2 mag. below the brightest). Off-emission line images will be used to distinguish the PN from stars and clusters in NGC 5128. At a distance of $\sim$3.8 Mpc, it is also close enough to obtain low dispersion spectra for abundance studies of PN. The 4m telescope spectra of a few PN (Walsh et al. 1999, A&A, 346, 753) can be vastly extended with 8-10m telescopes. Multi-slit spectrometry of PN in selected fields in NGC 5128 has been obtained using VLT FORS1, in multi-slit mode. The spectra are deep enough to detect T_e and N_e diagnostics, allowing forbidden line abundances (to $\pm$0.2dex) of He,N,O,N,Ne,S to be measured. With multi-slitlet spectrometers on large telescopes, it becomes feasible to collect spectra of all the PN in NGC 5128 to some line flux limit, enabling an unprecedented study of a well-defined sample of PN in a single galaxy.